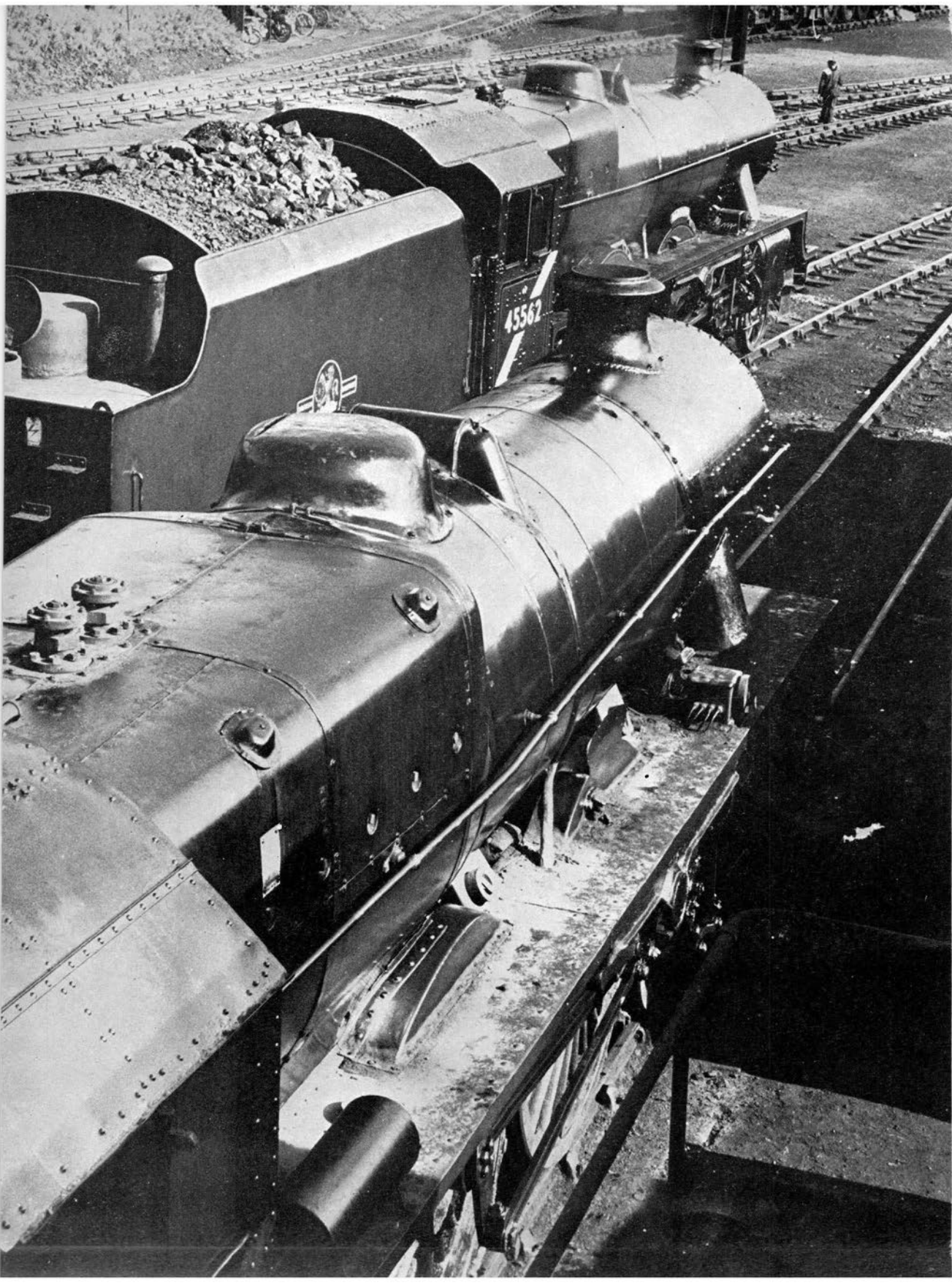
Stanier Locomotives

A Pictorial History by Brian Haresnape

Stanier Locomotives

Frontispiece overleaf. Jubilee class 4-6-0s Nos. 45562 *Alberta* and 45675 *Hardy*, at Carnforth on June 17, 1967. [*P. Claxton*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Brian Haresnape

STANIER LOCOMOTIVES

A Pictorial History

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Foreword

There are some names which will remain immortal in the 160 year saga of steam locomotion, and amongst these will stand that of William Arthur Stanier.

No theoretician, but a born mechanic; no autocrat, but a human and kindly man, he did not himself invent anything, and yet a Stanier locomotive was unmistakable to all students of steam. His fame rested on the bold and imaginative manner in which he re-stocked the LMSR, on the harmonious way in which he combined two opposed schools of locomotive design, and on the influence his work had upon his followers down to the last days of steam.

The author of this pictorial survey has brought understanding and evident enjoyment to the congenial task of relating something about each of the different designs for which Stanier was responsible, and in selecting a range of illustrations which will make these vanished engines re-live for all those who knew and loved them in their heyday.

E. S. Cox

Below. Coronation Pacific No. 46225 *Duchess of Gloucester,* climbing the 1 in 131 past Wreay, with the 9.56 am Glasgow Central–Euston extra on Easter Monday 1963. [*P. J. Robinson*

Introduction

Few of us who grew up during the years when the locomotives described in this work were the mainstay of the LMSR motive power fleet, could have foreseen the astonishingly swift decline and fall of steam power on British Railways. To us these rugged and powerful workhorses were a part of our everyday life—our environment—and the sights and sounds of steam formed a constant backcloth to our activities.

We could not visualise—nor, I suppose, did we wish to—the spectacle of Shap Fell without that relentless battle for adhesion which sent sounds echoing far across the bleak hillsides to mingle with the bleat of sheep and the cry of the curlews, and dark powerful exhausts high into the sky overhead. To us, such railway centres as Crewe, Derby or Carlisle were the palaces of steam, and many were the pilgrimages we made. In the postwar era, when 'spotting' was most prolific, we took for granted those regular gatherings of enthusiasts on platforms and linesides; complete with ABC's, notebooks and sandwiches. Steam, and in particular steam in action, roused us and enthralled us as no diesel or electric can do today.

On the LMSR it was the locomotives of Sir William Stanier which represented the character of that great railway during its finest years, and somehow the deep mellow tone of the Caledonian bass siren, which Stanier adopted in place of the usual high-pitched locomotive whistle, seemed to play an important part in the proceedings. Whether heard from afar, across the landscape, or in the confines of an industrial yard or large station, the Stanier siren evoked the same image: one of sturdy modern locomotives, efficiently working the trains of Britain's largest railway system.

When W. A. Stanier accepted the post of Chief Mechanical Engineer of the London Midland and Scottish Railway, commencing on January 1, 1932 he also accepted a personal challenge of considerable proportions. His career, until then, had been influenced by the strong traditions and progressive policies which had been established by G. J. Churchward at Swindon, for the Great Western Railway. In the early years of this century, Churchward had developed a fleet of standard locomotive types with modern design features. The Swindon designs were so good, in fact, that they remained the basis for all subsequent development on the GWR, and C. B. Collett (who succeeded Churchward as CME), continued with a steady policy of refinement and improvement that must have seemed like second nature to him.

In contrast, when Stanier moved from Swindon (where he had been Collett's Principal Assistant, and a leading member of an established and brilliant team), to the LMSR, he was faced with a situation far less settled. I do not need to repeat here the story of the early years on the LMSR, when Fowler was in charge at Derby—culminating as it did with the extraordinary affair of the design and construction of the Royal Scot class—as this has been told both ably and often. The important point is, that after a period of frustration and confusion, the arrival of Stanier must have represented a heaven-sent opportunity to 'get down to brass tacks'. There were certainly some keen and devoted staff in the drawing offices; all they needed was a clear directive.

On the other hand, Stanier came to a railway which had already developed the

Above. Line-up of Stanier steam power at Carlisle, waiting to take forward trains to Glasgow and Perth. Coronation Pacific No. 46244 *King George VI* on the left; Jubilee 4-6-0 No. 45724 *Warspite* in the centre, and on the right Princess Royal Pacific No. 46201 *Princess Elizabeth.* [*E. Treacy*

organisation of locomotive repairs to a high degree (partly under the guidance of Beames), and had cut down time in the workshops to a level not attained by any other company. All that was still lacking was an appreciation of the value of fine and accurate workmanship, and this was the very quality which Stanier (by virtue of both his instinct and his Swindon training) was able to graft onto existing LMSR practices, to produce overall maintenance standards unsurpassed anywhere in the country.

For the production of new locomotives, the brief given to Stanier was obviously influenced by what had been achieved by the GWR at Swindon. He was to introduce modern standardised locomotives for the entire range of operations, and to cut out the deadwood from the existing locomotive stock.

Obviously Stanier was faced with some unpleasant tasks, not least in the field of human relationships, and the early days must have been tense indeed for him, as he established both his own technical beliefs and his personality in 'foreign' surroundings.

In view of this, the appearance of his first important locomotive, the Pacific No. 6200 *The Princess Royal*, just seventeen months after he had taken office, is all the more remarkable. Here at last was the heavy express power—comparable to that on the rival LNER—to work the heavy Anglo-Scottish expresses. But this was just

the beginning of what might justifiably be called a motive power revolution. The greatest need was for mixed-traffic power, and for locomotives capable of working over most parts of the LMSR system. Designs were completed for 4-6-0s (both 2- and 3-cylinder versions), for 2-6-4Ts, 2-6-2Ts, and a heavy freight 2-8-0. These began to emerge in 1934/5, by which time considerable experience had been gained with the prototype Pacifics, and with a batch of 40 2-6-0s, which had been constructed at Crewe.

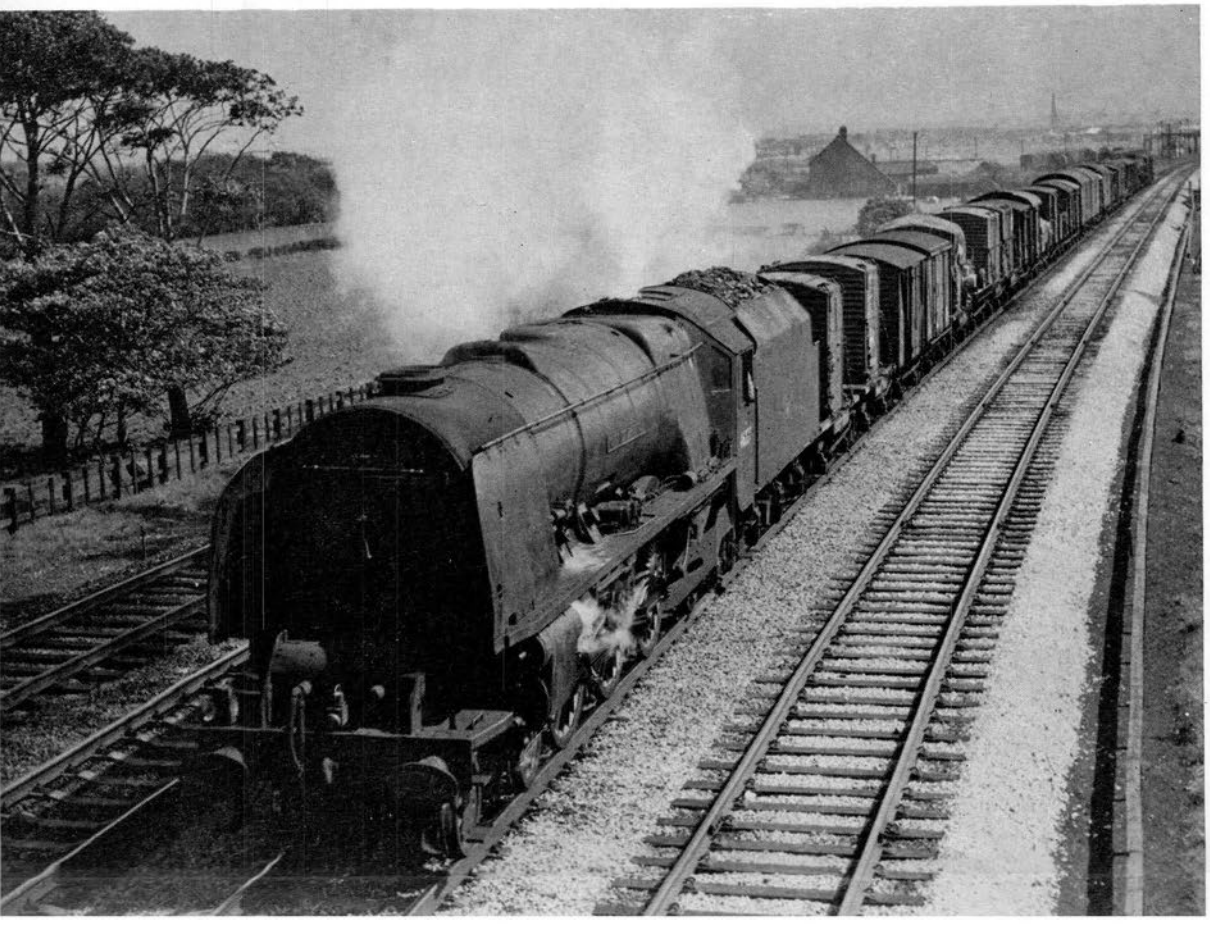
The most important early lessons learned were that tube proportions and ratios required a much closer study than had previously been accorded to them, and that Swindon style low-degree superheat did not come up to expectations in LMSR operating conditions. Experience with Nos. 6200/1 soon showed the need for second thoughts on these features, and a series of modifications (including provision of completely new boilers) took place in attempts to improve steaming. Similar troubles arose with the early batches of domeless, low-degree superheat 4-6-0s; 2-8-0s; 2-6-4Ts and 2-6-2Ts, but determined efforts to improve matters soon produced results. Once Stanier had shaken off one or two Swindon prejudices the way was clear for experiment—albeit on a somewhat hit-and-miss basis, as there were no testing-plant facilities comparable to those available in

Below. Stanier's classic mixed-traffic 4-6-0 design—the ubiquitous 'Black Fives'—were to be found virtually all over the system. Few locomotives have achieved such popularity amongst the men who had to service and work them every day. An early 'Black Five', with domeless taper-boiler is illustrated. No. 45211 was photographed passing Black Rock with a Manchester–Leeds semi-fast. [*K. Field*

Above. Coronation Pacific No. 6220 *Coronation* heads the 'Coronation Scot' train of 1937 northwards from Euston, through Kilburn High Road. [*E. R. Wethersett*

Opposite. Final form of the Coronation Pacifics; minus streamlining. No. 46225 *Duchess of Gloucester*, photographed at Winwick on a Crewe–Carlisle parcels train, August 1964. [*J. R. Carter*

Below. Also on a Crewe–Carlisle working, at Winwick; No. 46237 *City of Bristol*. May 14, 1964. [*J. R. Carter*

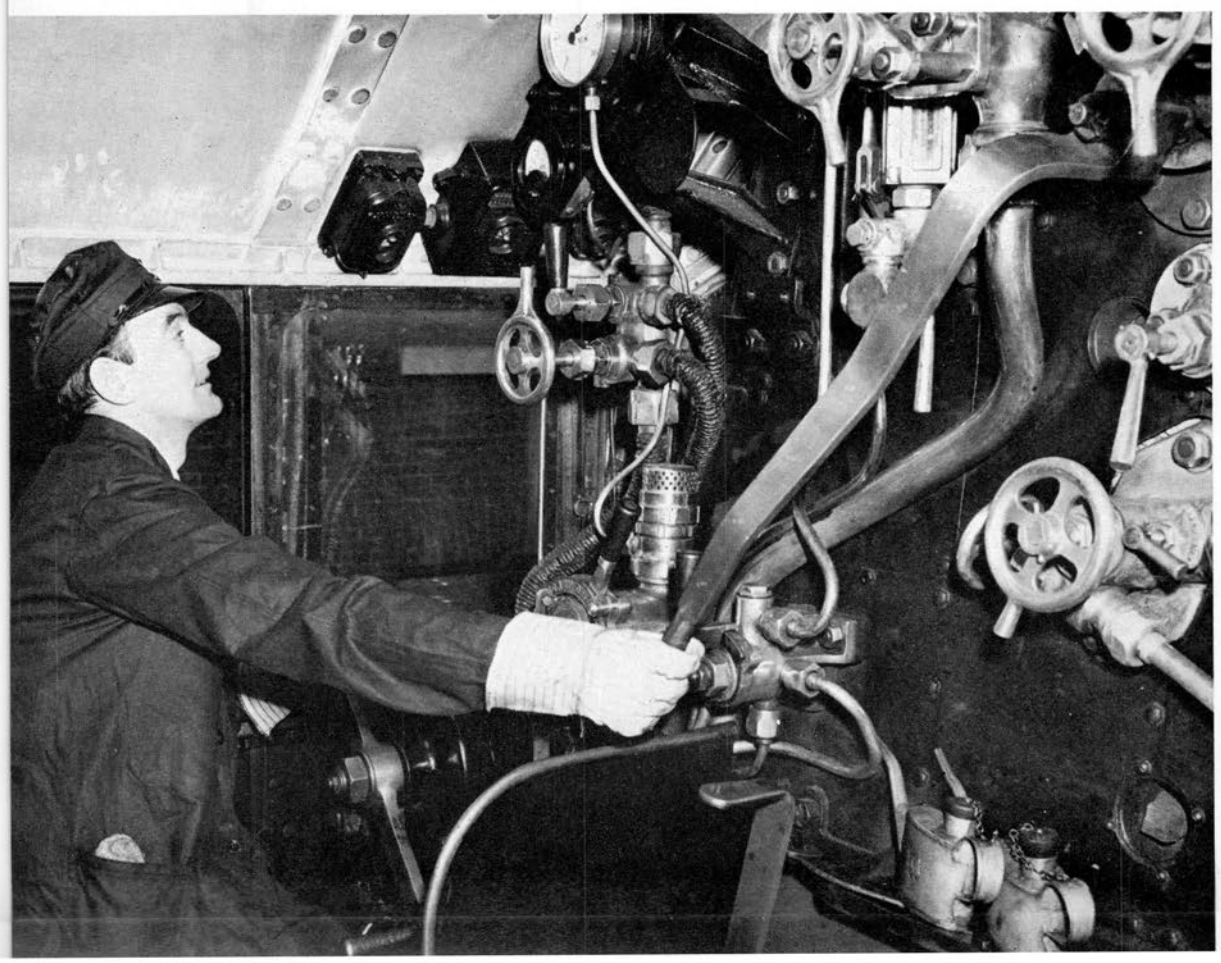


46225

later years. Nevertheless, improvements in boiler design and draughting were soon forthcoming, and the way was clear for production of a range of highly satisfactory standard locomotive designs. By the end of 1935 there were 325 Stanier locomotives in service, whilst by the end of 1939 no less than 1225 were in service, and a wholesale slaughter of pre-Grouping types had taken place.

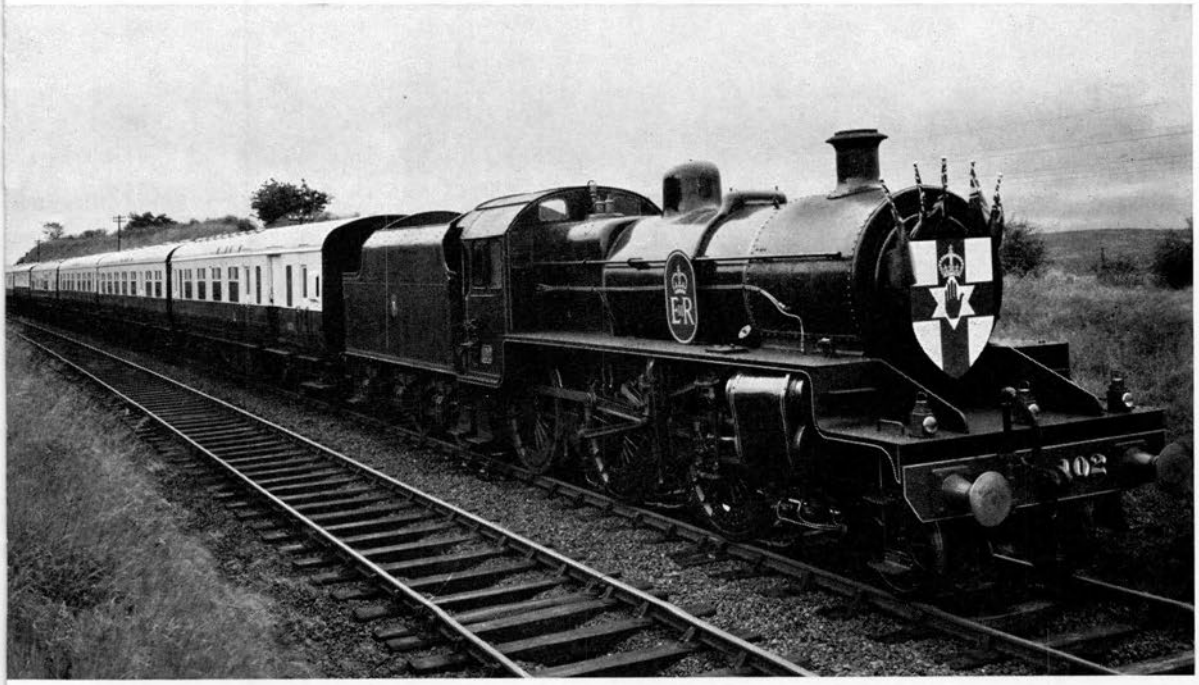
Whilst on the subject of boiler design, I would mention that in the following pages I have attempted to portray the main changes and improvements that took place with each class. But a few general words here would not be at all out of place. All the Stanier designs except No. 6170 *British Legion* and the Coronation class Pacifics, started life with domeless boilers, which were associated with two row (low-degree) superheaters. Except in the case of the first 10 2-6-0s (see page 26), the safety valves were on the firebox, and the small dome cover amidships in fact housed the top feed valves. No Stanier engine had a combined dome and top feed—despite frequent references to such a feature, in the enthusiast press. As soon as it was found to be desirable to introduce a steam dome on top of the taper-boiler the top feed was placed separately just ahead of it in a semi-cylindrical casing. A boiler variation which is not readily discernible from study of photographs, should also be mentioned. The earliest Stanier engines had vertical firebox throatplates and large boiler barrel and tubes. To obtain better proportions, later boilers had sloping throatplates which provided a firebox longer in the upper part, to give a better combustion volume, and tubes 1 ft shorter than on the originals, which in conjunction with smaller diameter

Below: The standard cab layout of Stanier's locomotives was much appreciated by the enginemen. Visibility was good, and comfortable tip-up seats were provided. [*BR*



Above. A 'Stanier' design produced without his aid. The 0-4-4Ts were a product of the Lemon era, and show obvious Fowler-cum-Midland parentage. No. 41908 was photographed at Headstone Lane returning to Watford after a spell of duty on the Stanmore Branch; June 24, 1952. [*C. R. L. Coles*

Below. Although the chimney, top feed and tender show Stanier influence, the overall design of the Northern Counties Committee 2-6-0s (and the basically similar 2-6-4Ts) was based upon the Fowler 2300 series 2-6-4Ts of the LMSR. Stanier did not interfere with the design. No. 102 is shown on Royal Train duty. [*UTA*

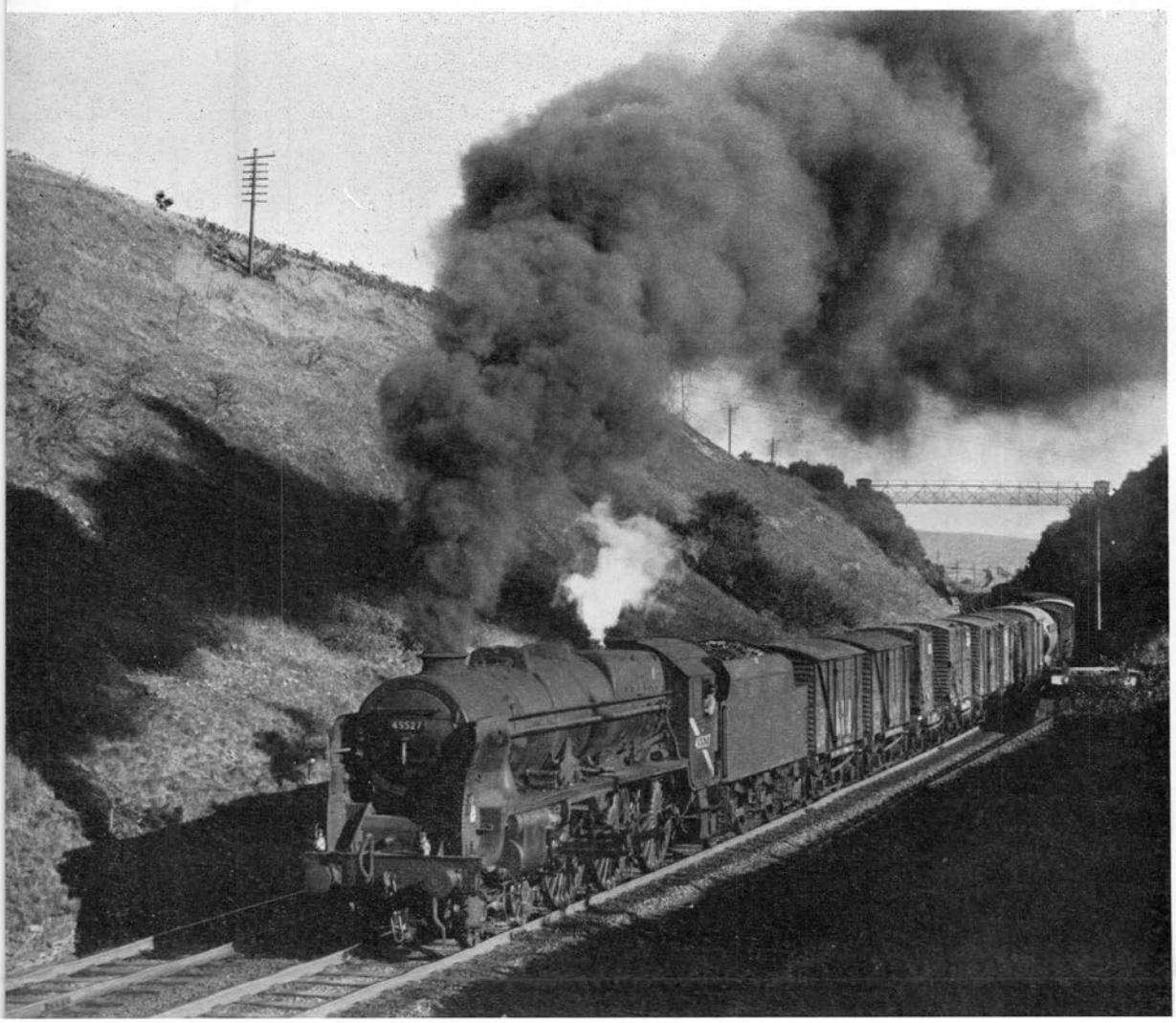


tubes permitted large free area; so important for lively steam production.

The taper-boiler, with separate dome and top feed, became the hallmark of a Stanier locomotive, along with a good looking chimney and generally neat appearance. There was no embellishment of the type favoured by Swindon, of copper or brass, but the workmanship was good and the designs bore considerable evidence that both functional and aesthetic aspects had received careful attention at the drawing board stage. One could eulogise for hours on, for example, the magnificent Coronation Pacifics or the sturdy 'Black Fives', but I would rather that the pictures for the most part spoke for themselves. Aesthetically, I consider that all Stanier locomotives were well proportioned and well detailed, with the exception of his early 2-6-0 design and his small 2-6-2T. (Is it pure coincidence that these two types proved to be the least satisfactory in service, I wonder?). The term handsome is certainly appropriate to all his express passenger engines, whilst the transformation Stanier brought about when he rebuilt the Fowler Royal Scots, was striking indeed.

It is not my intention to dwell upon details of Stanier's personal career, as this aspect has already been excellently portrayed in two biographies,* whilst the background story to the design and development of his locomotives has also been brilliantly essayed.† The object of this

Below. Rebuilt Patriot No. 45527 *Southport* (minus nameplates), casts its shadow upon the cutting side as it approaches Shap summit with a freight; September 1, 1964. [*R. Sewell*



Above. Converted Royal Scot class 4-6-0 No. 46136 *The Border Regiment* darkens the sky as it passes Wreay with the Sunday Glasgow–Liverpool/Manchester express in October 1963. [*P. J. Robinson*

present work is to present, in pictorial format, the general story of the Stanier engines. I hope that many fond memories will be revived by the illustrations, and that at the same time, a clearer picture of their development and operation will present itself to the reader. Although the emphasis is upon the visual, rather than the purely technical aspects of Stanier's locomotives, I have not considered it necessary to give exhaustive details of the livery changes and variations which took place (although a few special liveries are mentioned as a matter of general interest), as this aspect has also been comprehensively described in a recent book.‡ Neither have I included details of specific performances by locomotives, either in everyday service or on test runs, as this aspect has been most fully chronicled over the years by such noted experts as Cecil J. Allen and O. S. Nock. A further deliberate omission concerns accidents involving Stanier locomotives; I do not consider that these unfortunate tragedies tell any relevant story.

Two locomotive designs, often attributed to Stanier, are not described. I refer of course to the small 0-4-0ST and the 0-4-4T. The saddletank was a pure Kitson industrial design, ordered in a form to suit the needs of the LMSR, and had no Stanier influence at all. The 0-4-4T [see illustration on page 13], was obviously a

*1. *WILLIAM STANIER.* A BIOGRAPHY BY O. S. NOCK. IAN ALLAN LTD.

*2. *MASTER BUILDERS OF STEAM.* H. A. V. BULLEID. IAN ALLAN LTD.

†*LOCOMOTIVE PANORAMA* (2 VOLS.). E. S. COX. IAN ALLAN LTD.

‡*LOCOMOTIVE LIVERIES OF THE LMS*, D. JENKINSON, ROUNDHOUSE BOOKS. IAN ALLAN LTD.

Above. Stanier 'Black Fives' took part in the activities on Sunday, August 11, 1968, when the last BR operated steam train was hauled by 'Black Fives' and by a BR Britannia Pacific. Nos. 44871 and 44781 were photographed approaching Ais Gill summit on the return journey from Carlisle. Thousands lined the sides of the tracks to witness this memorable day. A considerable number of 'Black Fives' have been privately preserved in working order by enthusiasts. Two have recently been named; No. 45110 has become *R.A.F. Biggin Hill,* and No. 5428 has become *Eric Treacy.*

[*D. Wharton*

Derby development of the Fowler era, produced when E. J. H. Lemon was acting CME pending Stanier's appointment, and it was pure coincidence that the locomotives were constructed when Stanier was in office. Were one to credit these designs to Stanier, it would be equally logical to say that the batches of Fowler 0-6-0s produced as late as 1937-41 were also Stanier types! Likewise, the 2-6-0 [see page 13], and 2-6-4T designs for the LMSR-operated Northern Counties Committee line, in Northern Ireland, were basically Fowler engines, with parallel boilers. In fact, on the 2-6-0, the boiler, cylinders, valve gear and all details were almost identical with the LMSR Fowler 2-6-4Ts (although the shape of the grate was different), but with the coupled wheels increased to 6 ft diameter.

Stanier's influence upon the final years of steam locomotive design in this country was considerable. The team which worked so well to produce his LMSR standard types was destined to continue along a similar path, culminating with the BR standard designs of 1951. When, in 1942, Stanier was appointed as a scientific advisor for the Ministry of Production, he ceased to take an active part in the locomotive affairs of the LMSR, although he remained as a consultant. C. E. Fairburn was appointed as acting CME until late in 1944 when Stanier resigned in order to devote himself fully to his wartime post. But the resignation of Stanier—sad blow though it undoubtedly was to the LMSR—did not mean the end of the Stanier policy. Fairburn, and finally, H. G. Ivatt, continued to develop his standard types, bringing in modifications only when the changed operating conditions of the immediate postwar years dictated that increased emphasis must be placed upon labour-saving maintenance and servicing, to reduce costs.

No greater tribute can be formed to the soundness of design and construction of the locomotives of William Stanier, than that examples survived in use right up to the final day of steam operation on British Railways, and that they outlived many engines introduced in later days. Recognition of his own personality and achievements included Knighthood in 1943, and election as a Fellow of The Royal Society in 1944.

Throughout the preparation of this work—which has in itself proved a most enjoyable task—I have had the invaluable help of two men, and I wish to place on record my sincere thanks for all the assistance and advice they have so willingly given. My thanks, therefore, to E. S. Cox (whose letters are as informative and enjoyable as the excellent books he has written), for reading the manuscript and for advice upon the technical details; and to Alec Swain for so patiently collecting a vast quantity of references and data, which has proved invaluable in sorting out the overall story.

Finally I would also like to thank the following for their help in supplying information or photographs: J. R. Carter; H. C. Casserley; J. Edgington; R. G. Jarvis; E. J. Jones; D. Jenkinson; P. M. Kalla-Bishop; S. C. Nash and P. Ransome-Wallis. The line drawings are reproduced by courtesy of the *Railway Gazette.* The illustration used on the dustjacket is from a photograph by Paul Riley.

Brian Haresnape, FRSA, NDD,
Sussex,
June, 1969

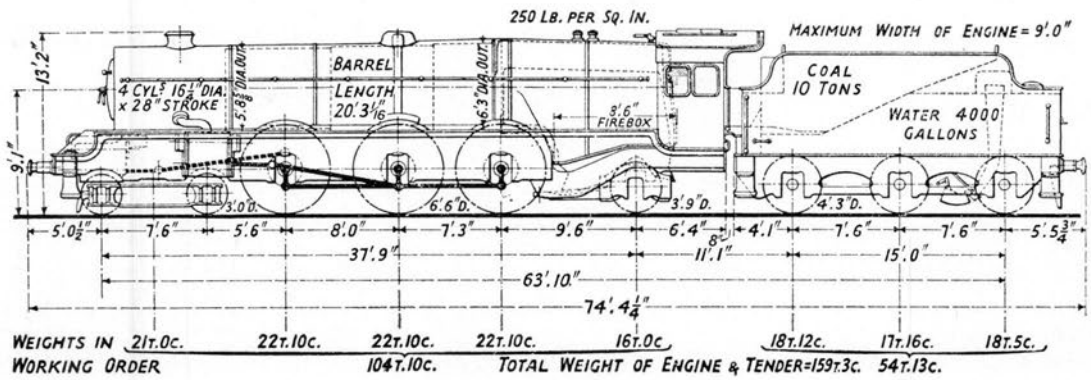
Section: 1 4-6-2 Class 7P
Express Passenger Engines

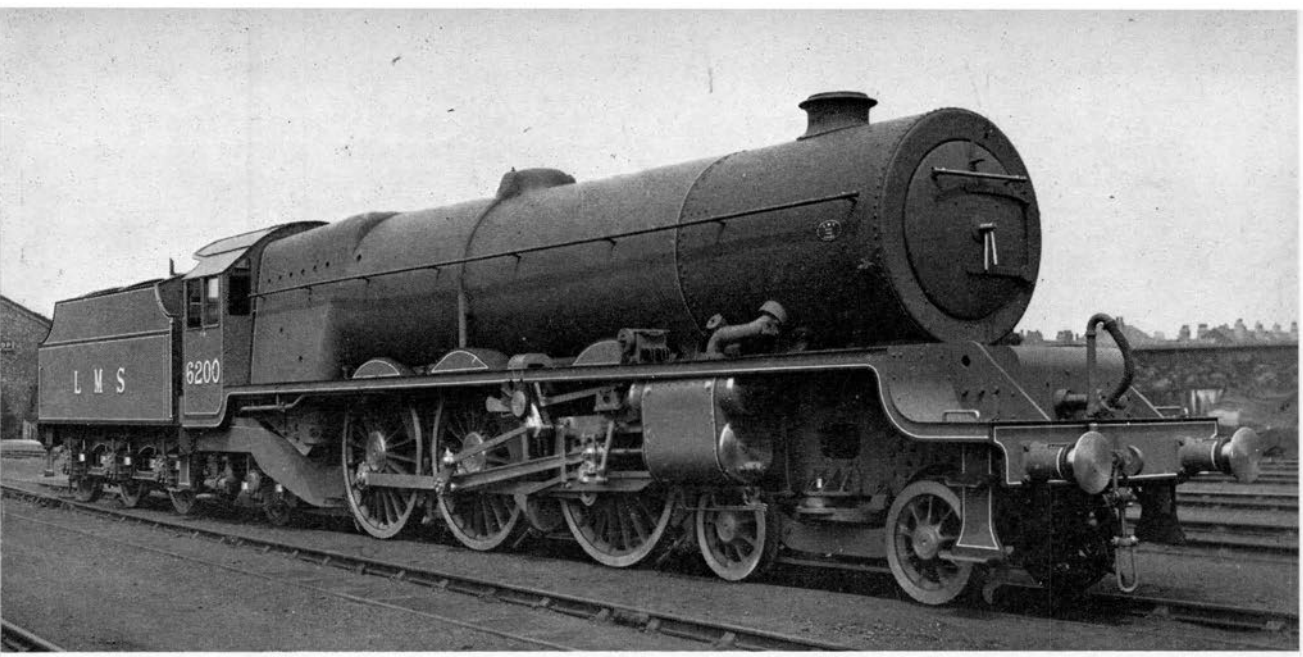
Introduced: 1933 Total: 12
Princess Royal

Although the Fowler Royal Scot class 4-6-0s were putting-up some good performances with trains of up to 420 tons on the Euston–Glasgow run it was nevertheless found to be desirable, by 1933, to have an engine of somewhat greater power, which would be capable of through working with trains of up to 500 tons, unaided. With the Royal Scots the practice was to change engines at Carlisle because the fire, grate and ashpan of the Royal Scots were likely to become over-choked with the products of $6\frac{1}{2}$ to 7 hours continuous combustion. With a larger engine this would not be necessary and this offered potential savings in operating costs. For the new engine, the increased power was to be obtained by means of an improved boiler, with a large grate area, and this demanded a wide firebox. To accommodate this feature, and the added weight involved, a 4-6-2 wheel arrangement was decided upon, with a Bissel type trailing truck.

Authority for the construction of three Pacifics was quickly forthcoming and work went ahead with such purpose that no more than 17 months after William Stanier arrived on the LMSR, the first locomotive was completed at Crewe, to be followed later the same year by the second prototype. What was to have been the third identical engine was however earmarked for completion as an experimental turbine locomotive of comparable power (see page 59).

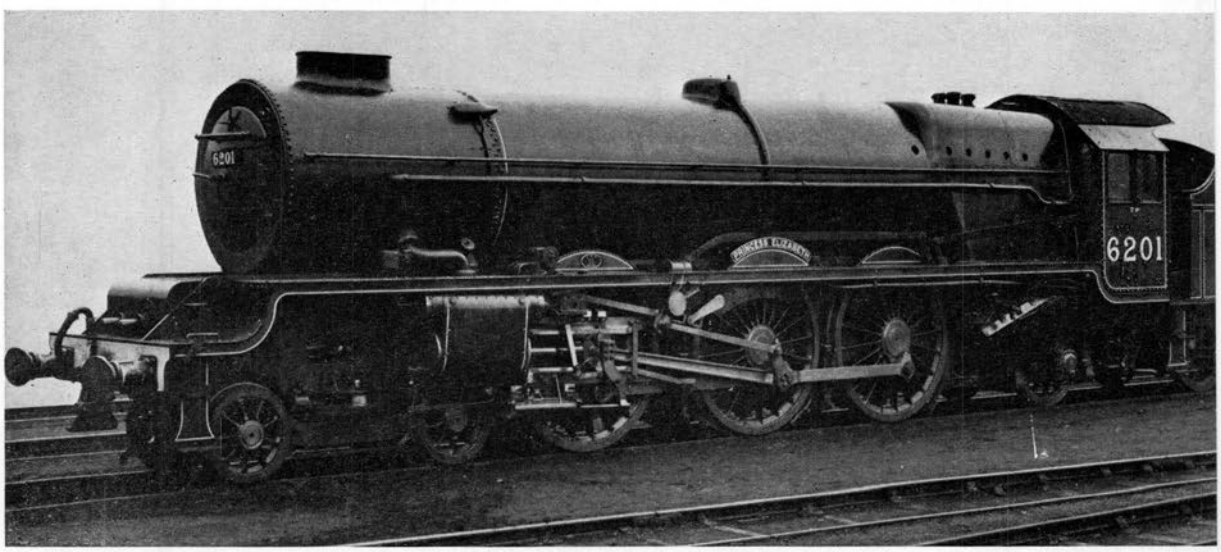
As first constructed, the two prototypes, Nos. 6200 *The Princess Royal* and 6201 *Princess Elizabeth*, clearly evidenced Stanier's Swindon background. There was a domeless taper-boiler with low degree superheat, whilst a number of smaller features such as the axleboxes and bogie design, and the Swindon smokebox, were also introduced. But in certain other respects Stanier broke away from Swindon practices, for example by using four independent sets of Walschaerts long-travel





Above. Princess Royal class Pacific No. 6200 was the first Stanier locomotive to enter service, delivered to traffic from Crewe on July 1, 1933. Portrayed here in works grey livery and prior to naming, is No. 6200 as originally constructed, with low superheat domeless taper-boiler. A dome-like casing housed the top feed clacks, and four 'pop' type safety valves were placed on the firebox. Features in common with the GWR King class 4-6-0 included the diameter of the driving wheels, 6 ft 6 in the four cylinders 16½ in diameter by 28 in stroke, the working pressure of 250 lb per sq in and the tractive effort of 40300 lb at 85 per cent working pressure. [*LPC*

Below. Whilst still carrying the original low superheat boiler, an experimental double exhaust system was tried out on No. 6201. The exhaust of inside and outside cylinders was led separately into each half of the double chimney, instead of being combined at the base of the blastpipe in the more usual way. The experiment was not a success and the engine was quickly returned to normal. [*BR*



valve gear and by retaining Derby type injectors. To reduce weight Bar frames were used for the leading bogie.

A much improved cab design was introduced, with carefully arranged controls and tip-up seats for both enginemen. Two side windows were provided, with a small folding window between them to act as a shield when the driver leant out beyond the cab side. Moreover, the taper-boiler improved forward visibility. An interesting point about these engines is that alone of the large express power of the final years of the LMSR, they did not receive smoke deflectors at any stage in their careers.

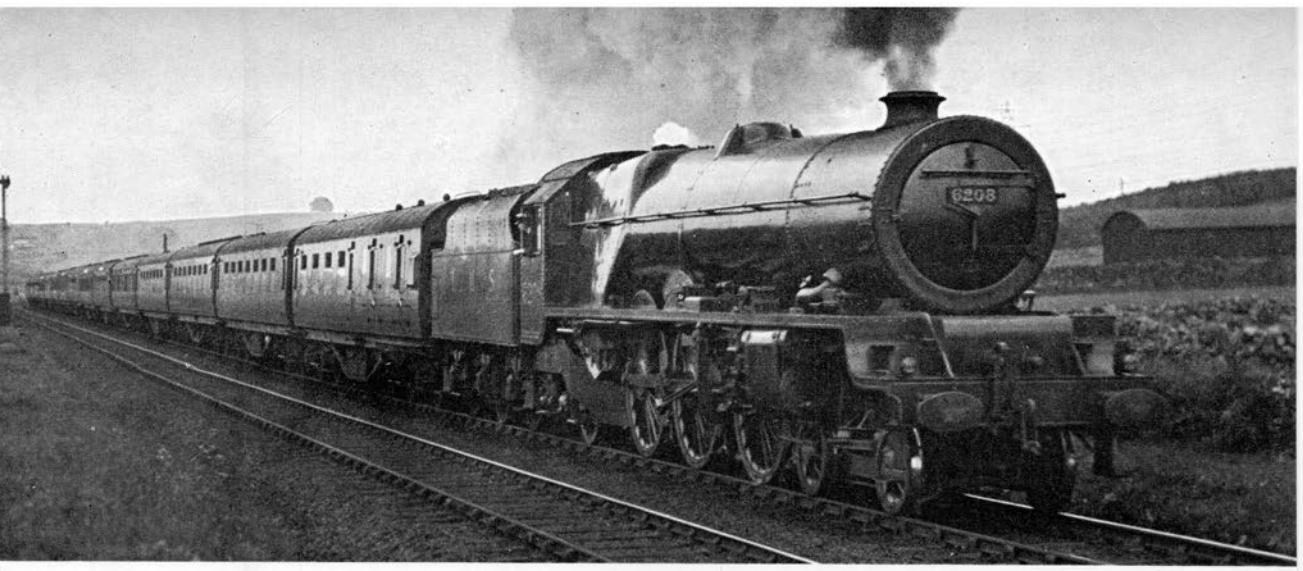
Externally they had a decidedly handsome appearance, which was spoilt on the two prototypes by the short six-wheel tenders of basically Midland pattern with low sides. Once these had been replaced by the new high capacity Stanier design, with high sides curved in at the top to clear the loading gauge, they looked at their best. In their outline these engines had some similarity to the GWR King class 4-6-0s, particularly at the leading end, but the massive rear end, with wide Belpaire firebox and additional external frame plates splayed outwards from the main frames, under the firebox and cab, gave a fine visual balance to the great length of the engine.

The engines were built as follows:

Nos. 6200-1	Crewe	1933
Nos. 6203-12	Crewe	1935

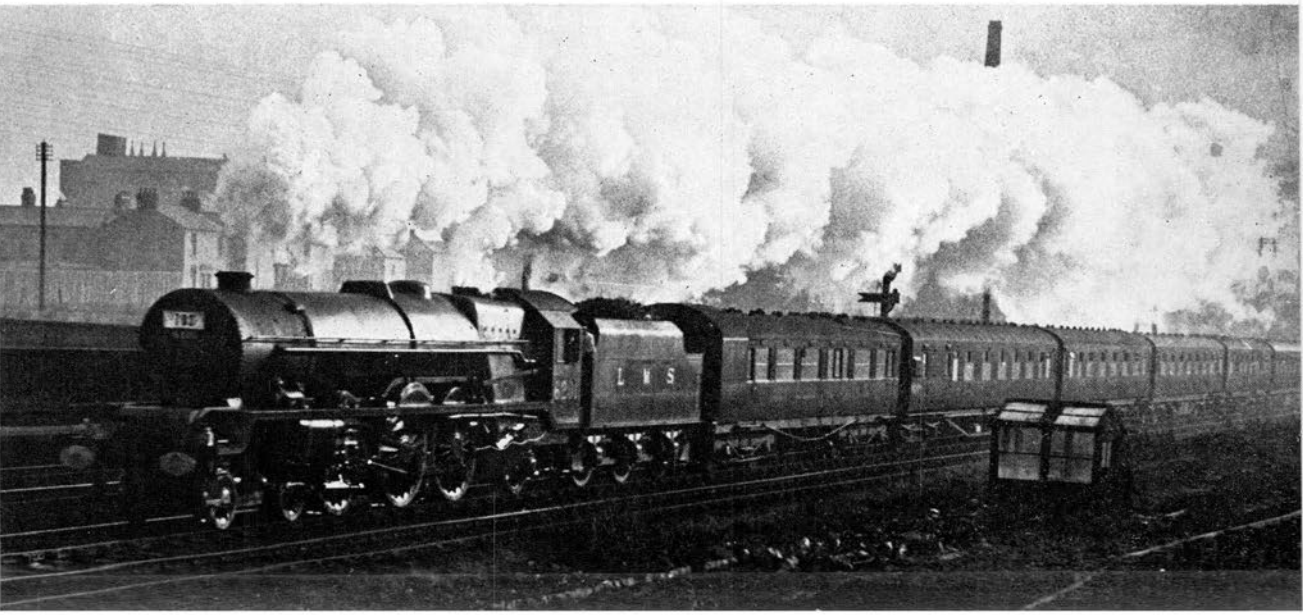
FIRST OF CLASS WITHDRAWN:
46204/10/1/2 10/61
EXAMPLES PRESERVED: 46201/3

Below. No. 6200 *The Princess Royal,* in original condition, hauling the up 'Royal Scot' express south of Rugby. The low-sided six wheel tender originally attached had roller bearings, and a coal capacity of 8 tons. [*F. R. Hebron*



Above. The remaining 10 Princess Royal Pacifics were not delivered until 1935, and a number of important modifications were made to the design, following experience gained with the two prototypes. In particular the lesson had been learned that Swindon style low superheat did not suit LMSR operating conditions, and the number of elements was doubled, from 16 to 32, with an increase in the superheated surface from 370 to 623 sq ft. The boiler was still domeless (steam was collected by means of a perforated pipe in the high front corner of the firebox; following GWR practice) and the barrel was shorter. The firebox heating surface was increased from 190 to 217 sq ft by creating a combustion chamber in the forward part of the firebox. Detail changes included the provision of new high sided tenders with a capacity of 9 tons of coal and 4000 gallons of water; recessed pipes to the top feed clacks; larger brackets for the outside valve gear, and a redesigned reversing lever. No. 6208 *Princess Helena Victoria* was photographed in the original condition of the second batch, heading the up 'Royal Scot' near Shap summit. [*E. Treacy*

Below. Modifications in attempts to improve the steaming of the two prototypes included provision of a completely new boiler, with a steam dome and forward top feed housing, as seen here on No. 6201 *Princess Elizabeth.* A new tender was fitted, with 9 tons coal capacity and 4000 gallons water. The two original low sided tenders fitted to Nos. 6200/1 were subsequently rebuilt with high curved sides and allocated to new Class 5 4-6-0s Nos. 5073/4 in 1935. The illustration shows the record breaking run of November 16, 1936, when the 401½ miles from Euston to Glasgow were covered in 5 hours, 53 minutes, 38 seconds, with a seven coach load. [*W. S. Garth*



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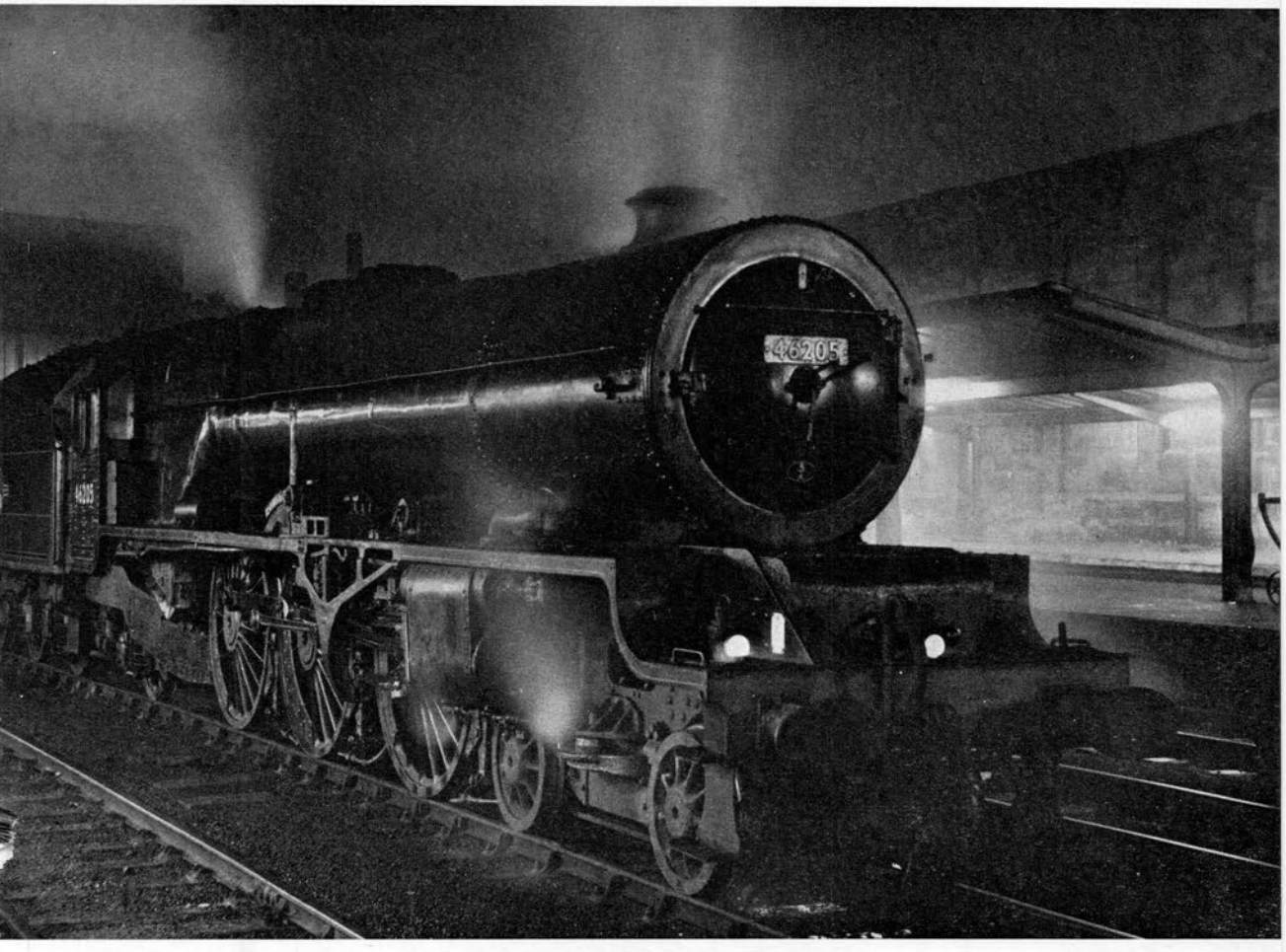


Opposite page:

Top. No. 6212 *Duchess of Kent* ran for some time with an experimental smokebox door, secured by 10 lugs around the perimeter, instead of the central screw lock which was standard for Stanier engines. The illustration shows No. 6212 pounding up the 1 in 200 to Castlemilk with the up 'Royal Scot'. [*F. R. Hebron*

Bottom. At the end of 1936/early 1937 another change of tenders took place, when all 12 locomotives received new 10 ton, 4000 gallon capacity tenders with higher curved sides. This feature is clearly visible in this rear ¾ view of No. 6206 *Princess Marie Louise*, heading north from London. [*E. R. Wethersett*

This page:

Above. No. 6205 *Princess Victoria* was the subject of another experiment, applied in 1937. The two inside sets of Walschaerts valve motion were replaced by rocking-levers, so that the outside valve motion operated the valves for the inside cylinders (a reversal of GWR practice, where the inside valve motion operated the valves for the outside cylinders). The modified motion bracket is clearly visible in this striking night scene, taken at Carlisle, as the locomotive (as BR No. 46205, in green livery) awaits the 9.46 pm Fish train, to work it forward to Crewe; November 31, 1960.
[*C. P. Walker*

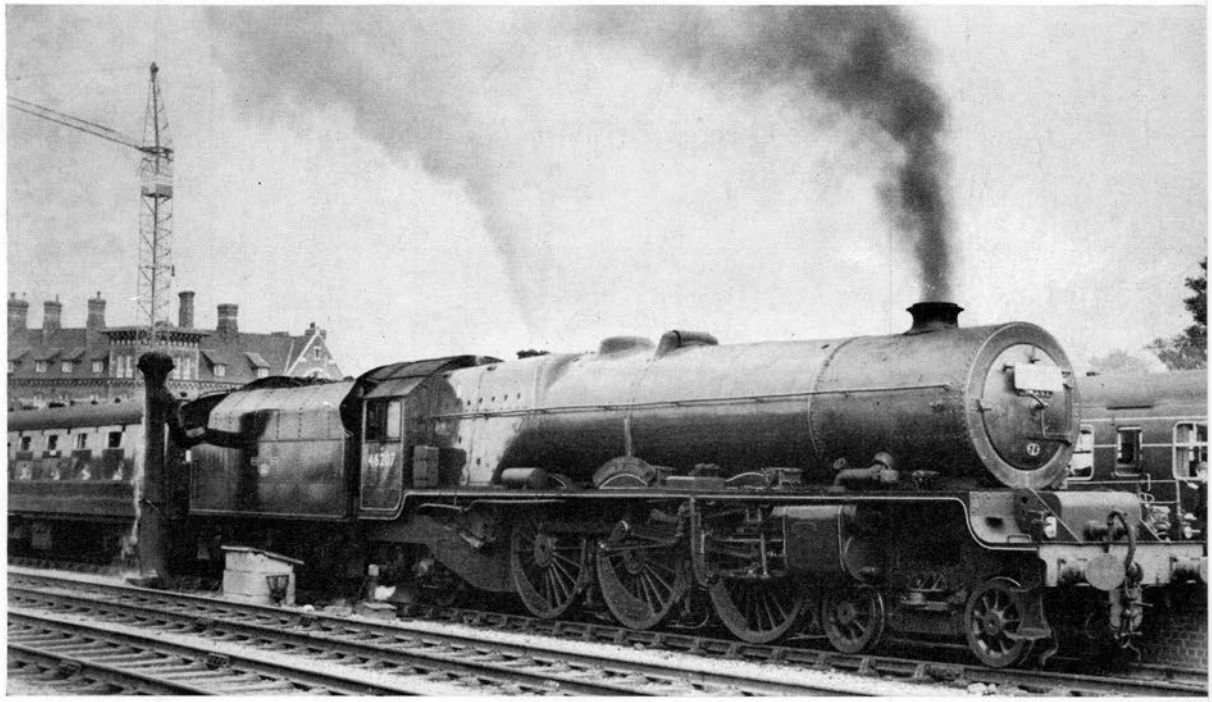
This page:

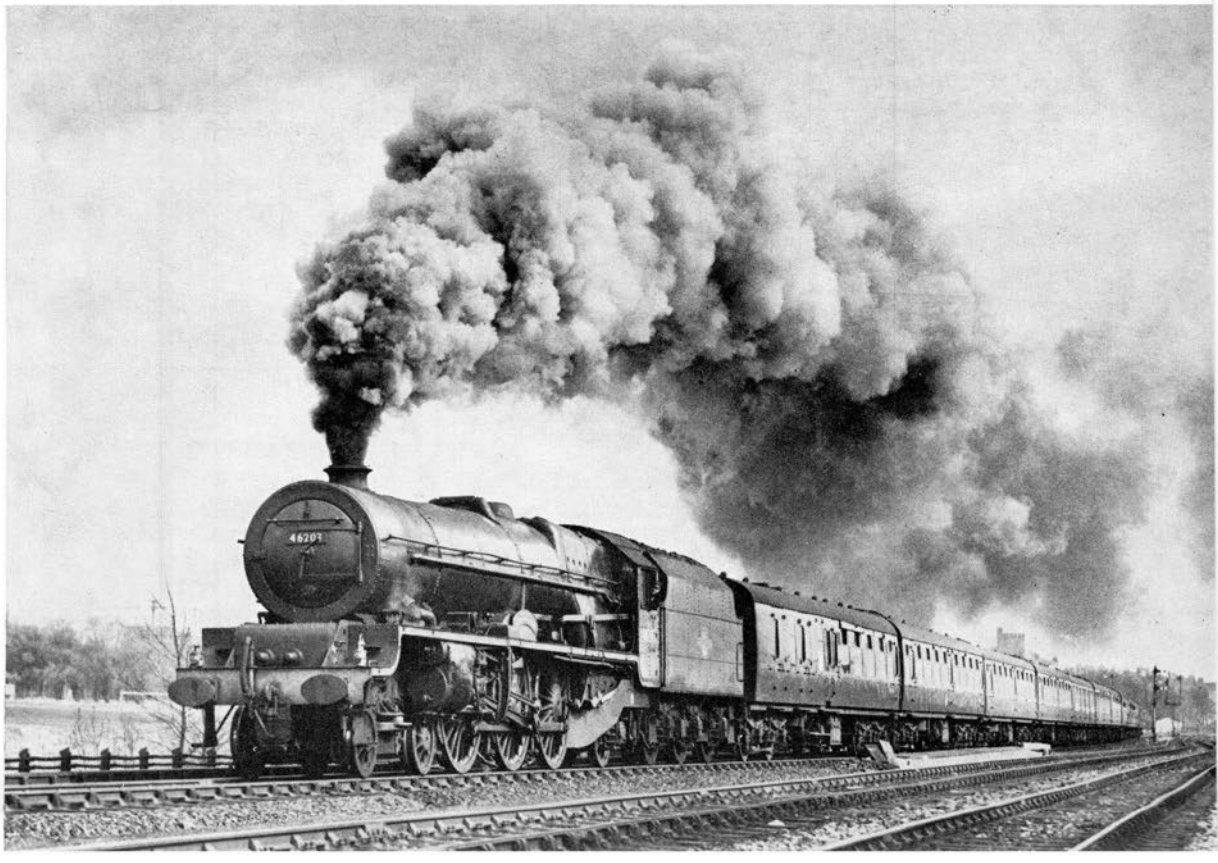
Above. Towards the end of January 1956, the Western Region experienced bogie troubles with their King class 4-6-0s, and their temporary withdrawal for rectification resulted in a shortage of heavy express power. As a result, two Princess Royals, Nos. 46207/10 were loaned to Old Oak Common for two months, and operated over both the West of England and the Birmingham main lines. Their duties included the 'Cornish Riviera' and No. 46210 *Lady Patricia* was photographed passing Stoney-combe Quarries on Dainton Bank, with the down train, on February 10, 1956. [*D. S. Fish*

Opposite page:

Top. In BR days the class sported a variety of liveries, ranging from LNWR style lined black, to BR blue and then later, green. But during 1958 four of the class received crimson lake livery, and No. 46207 *Princess Arthur of Connaught* was photographed in this beautiful livery, at Stafford. The engine is depicted in the final state of the class, with steam dome and separate top feed on the boiler, and fitted with BR standard AWS equipment. The final superheated surface was 586 sq ft and the total heating surface was 2516 sq ft. [*J. B. Bucknall*

Bottom. By early March, 1961 the entire class had been placed in store as a result of increased diesel availability. The summer traffic of the same year reprieved some of them temporarily, but scrapping commenced in the autumn. Much to everyone's surprise six locomotives were again returned to traffic at the end of January 1962, and were not finally withdrawn until the following autumn. No. 46203 *Princess Margaret Rose,* in green livery, was one of the engines which enjoyed this unexpected Indian Summer, and was photographed leaving Carlisle with a down Euston–Perth train, in April 1962. No. 46203 was unique in being the only LMSR Pacific to receive a heavy repair at Derby works, in the winter of 1951. [*S. C. Crook*




46203

Section: 2 2-6-0 Class 5F Mixed-Traffic Engines

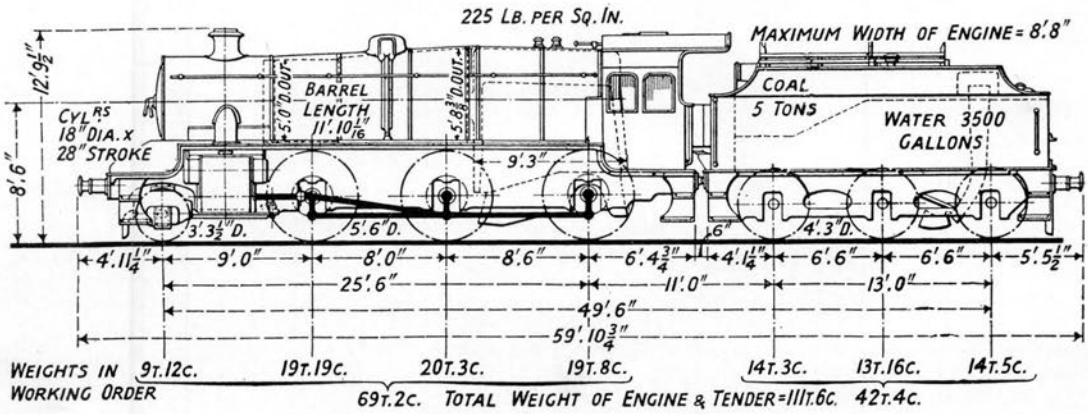
Introduced: 1933 Total: 40

Despite the fact that 245 mixed-traffic Moguls has been constructed to the successful Hughes/Fowler design of 1926—the well-known Horwich 'Crabs'—when a further 40 mixed-traffic locomotives were required in 1933, they were built to a new design, produced by the Horwich drawing office to Stanier's instructions.

The starting point in the design was to produce a locomotive of equivalent power to the Horwich 'Crabs' but with a boiler based upon Swindon practice, in principle if not in detail. The initial drawing was produced at Euston, outlining what the new Chief had in mind, and forwarded to Horwich for detail work to commence. This original drawing showed a domeless boiler with the safety valves housed in a domelike casing, and combined with the top feed clacks. Stanier was as yet an almost unknown personality at Horwich and, presumably in order to please him that office placed a typical GWR style 'coffeepot' safety valve casing upon the production drawings issued to Crewe, and engine No. 13245 emerged from the erecting shops on October 21, 1933 duly sporting this item of hardware. Far from being pleased, Stanier was very cross, and as soon as he saw it he ordered its removal and replacement by the dome-shaped casing which he had originally specified. He stressed that he had no desire to produce carbon copies of Swindon practice.

The next nine locomotives to emerge also had the safety valves situated forward on the taper-boiler, but had the modified casing. In the meantime Stanier had come to realise that there would not be room for this GWR type of safety valve on the larger locomotive boilers, in view of the LMSR loading gauge (particularly in Scotland) and he decided to adopt the short 'Pop' type of safety valves placed over the firebox, as was already standard practice on the LMSR, for all future construction.

Below. The drawing depicts the second boiler design.



Above. One of the original batch of 10 locomotives, with the safety valves located on the boiler and combined with the top feed in a dome-like casing. The domeless taper-boiler had a tube heating surface of 1256 sq ft, a firebox surface of 156 sq ft, and a grate area of 27.8 sq ft. This view of No. 13248 working a Huddersfield–Manchester slow train was taken near Marsden. These engines were originally fitted with a crosshead vacuum pump on the left hand side, a feature removed from all Stanier engines, *circa* 1939, as it was found to be unnecessary.

[*P. Ransome-Wallis*

The remaining 30 locomotives of the class were built with a revised boiler, with the safety valves on the firebox and with top feed clacks on the domeless boiler. It was one of these later locomotives, suitably renumbered for the occasion, that posed as No. 13245 for the official photographs of the class. The 10 original boilers, with non-standard safety valves, were allowed to remain in service until they became due for their first major overhaul, as this was the earliest economic opportunity to modify them.

Outside Walschaerts long-travel valve gear was adopted, and the cylinders were arranged horizontally (the only Stanier design with this feature), they were 3in less in diameter than the cylinders on the 'Crabs'; a reduction made possible by the higher working pressure of 225lb per sq in.

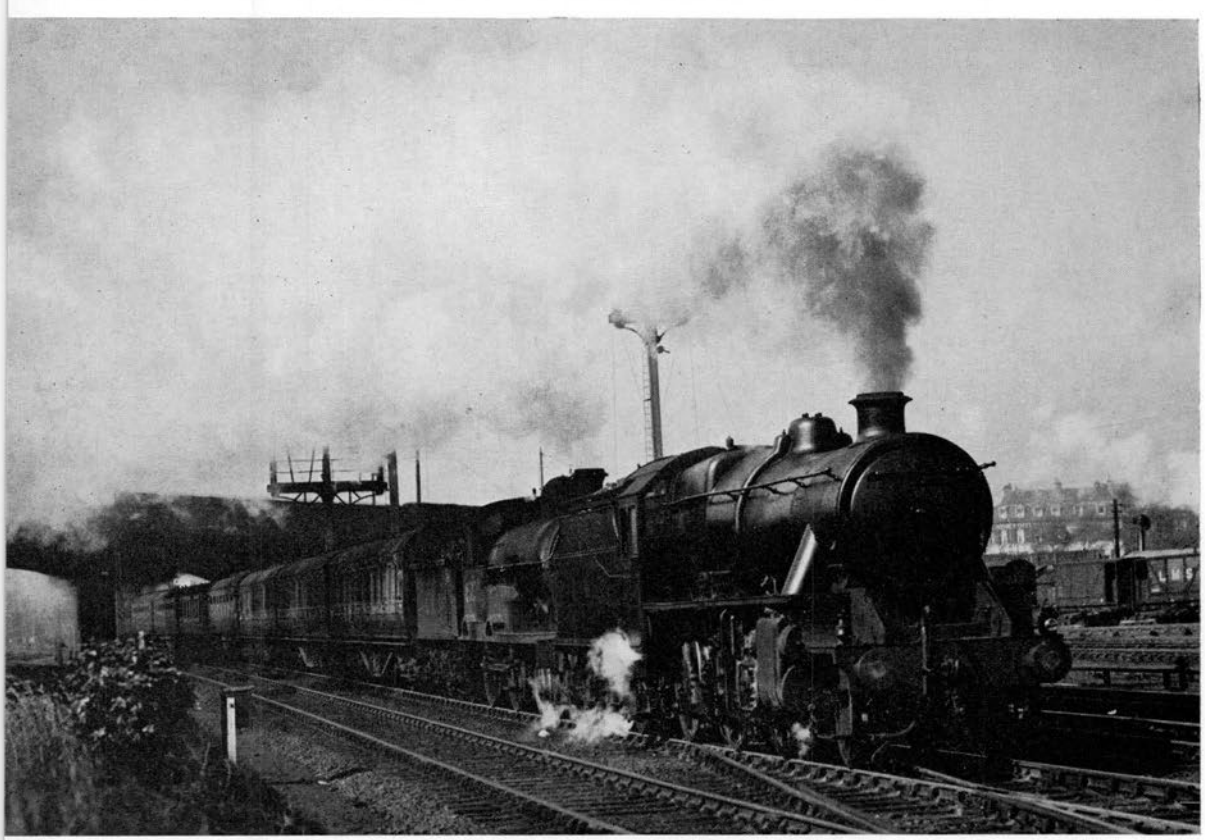
The engines were built as follows:

Nos. 13245-57	Crewe	1933
No. 13260	Crewe	1933
No. 13263	Crewe	1933
Nos. 13258-59	Crewe	1934
Nos. 13261-62	Crewe	1934
Nos. 13264-84	Crewe	1934

When new, the power classification was 4F, subsequently altered to 5P4F (in 1934), then 5P5F (in 1938/39) finally becoming 5F in late LMSR days. When new the class were allocated to all four operating divisions, as follows:

Nos. 13245-13254	Northern Division
Nos. 13255-13266	Midland Division
Nos. 13267-13279	Western Division
Nos. 13280-13284	Central Division

(Nos. 13245-13254 at first had no water pick-up fitted.)



Above. The class was renumbered in 1934, to become Nos. 2945–2984. In this photograph of No. 2951 double-heading George the Fifth class 4-4-0 No. 25378 *Widgeon,* on a Liverpool–Holyhead train at Edge Hill, the Mogul still carried the original boiler. [*E. Treacy*

In 1934, Nos. 13248/51 were recorded working on Carlisle-Glasgow stopping trains, and No. 13254 was observed on Glasgow-Aberdeen express duties.

Of all the Stanier classes they appear to have been the least recorded or photographed. Externally they were not particularly attractive machines—with their curiously low horizontal cylinders, shallow section running-plate and narrow Fowler tenders. The exterior of the cab resembled Horwich, rather than standard Stanier practice. Throughout their somewhat undistinguished lives they were in black livery. At first this was lined-out with red; in later LMSR days they were plain black. In BR days some received LNWR-style mixed-traffic lining-out. One interesting point is that most of this class did not have the characteristic Caledonian bass siren fitted.

It is perhaps significant that no repeat orders were ever placed for this class, although no doubt the success of the 1934 'Black Fives' as mixed-traffic engines was one factor against them. A final point of interest is that late in their careers some examples of the class were overhauled at Swindon.

FIRST OF CLASS WITHDRAWN:
42976 7/63
LAST OF CLASS WITHDRAWN:
42963 7/66
NONE PRESERVED

Above. Also still sporting its original boiler, with safety valves combined with the top feed casing, No. 2950 is shown in clean black livery, lined out in red.
[*P. Ransome-Wallis*

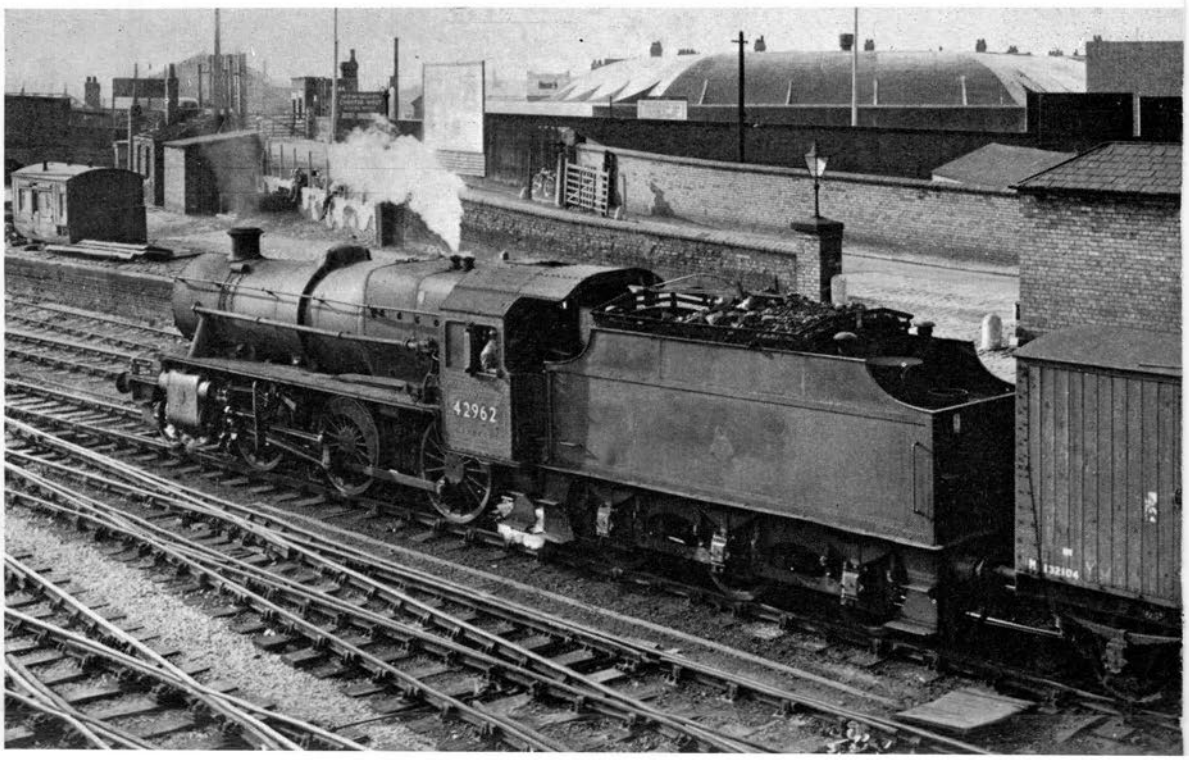
Below. One of the second batch of 30 locomotives, with revised boiler design. This was larger, with a tube heating surface of 1216 sq ft and a firebox heating surface of 155 sq ft. The grate area remained the same at 27.8 sq ft but a 21 element superheater gave a superheating surface of 224 sq ft compared with 193 sq ft in the original boilers. Tractive effort at 85 per cent of the boiler pressure was 26288 lbs With modified boilers the engine plus tender weight was increased from 107.2 tons to 111.3 tons. No. 42983 was photographed near Shap Wells with the down 7.40 am Crewe–Carlisle class H through freight, on May 26, 1952, with a 2-6-4T providing rear end assistance.
[*E. D. Bruton*

Above. In later years the class operated mainly in former LNWR areas, ranging from the North Wales coast to the Carlisle–London line and the West Midlands. No. 42967 is seen somewhat further afield, at Chinley North Junction on the Saturdays only North Wales–Sheffield train, on August 30, 1958. As finally running the engines had a superheating surface of 244 sq ft and the length of the boiler barrel was increased to 12 ft $3\frac{9}{16}$ in. The total heating surface was 1633 sq ft.

[*N. Fields*

Below. This rear $\frac{3}{4}$ view of No. 42962 emphasises the discrepancy in width of engine and tender. The tender was of Fowler pattern as used on the 'Crabs', whilst the cab sides were a Horwich feature, with their slight cutaway at the rear end. The engine was photographed whilst shunting at Chester General on August 1, 1963.

[*S. D. Wainwright*



Section: 3 4-6-0 Class 5XP Express Passenger Engines

Introduced: 1934 Total: 191*

Jubilee

Fowler had recognised the need for a new express passenger design for intermediate main-line service; i.e. for operation over routes from which the larger Royal Scot class were barred, or over medium distances. By drastically rebuilding two LNWR Claughton class 4-6-0s he had produced a successful 5XP design with parallel-boiler and three cylinders; later known as the 'Baby Scot', or Patriot class. The decision was therefore taken to replace the Claughtons with further 'Baby Scots'—although these would be new engines, not rebuilds. At this juncture, Stanier arrived on the scene and he agreed to the completion of 50 new engines during 1932-4, but not before he had introduced a number of modifications in conformity with his own ideas and principles; chiefly in the design of the axleboxes, wheels and bogies (the first 10, Nos. 5502-11, did not have the improved bogie).

Thus it was entirely logical that when further locomotives of 5XP power classification were required, Stanier decided to develop the Patriot design in accordance with the principles he had laid down for the new range of standard types he was introducing to the LMSR. A low-degree superheat domeless taper-boiler replaced the Fowler parallel-boiler and various smaller items were redesigned, such as the cab and tender. But basically the new Stanier 3-cylinder 5XP was a direct development of the Fowler engines.

In volume one of his book *Locomotive Panorama*, E. S. Cox has lucidly described how the initial disappointing results of this design proved to be the chief factor which caused Stanier to rethink the merits of Swindon-style low-degree superheat. As first introduced, the Stanier engines proved inferior to the 'Baby Scots' so far as steam production was concerned. Several factors were involved. A reduction of nearly 100degF in steam temperature, due to employment of a superheater of only 14-elements (compared to 24-elements on the 'Baby Scots'), resulted in a pure loss of thermal efficiency; whilst the taper-boiler design produced a reduction in the total tube-free area through which the hot gases passed from firebox to smokebox. Finally, there were draughting troubles because the blastpipe and chimney dimensions were based upon the Swindon formula for four-beat engines and did not suit the six-beats of the 3-cylinder design.

Stanier did not immediately realise that these were the basic causes of the troubles, and a series of hit-and-miss modifications and trials was proceeded with in attempts to discover why the new class did not perform as expected. Meanwhile the engines had been ordered in some quantity, and a large number were delivered to the original specification whilst experiments were continued to resolve the problem. No testing facilities then existed comparable to the mobile and stationary testing-plants of the later days of steam; it was largely a case of trial and error. After various attempts (some of which only worsened matters), a successful combination of improved boiler design (with 24-element superheater), and reduced blastpipe diameter, transformed the Jubilees into competent locomotives which performed their role of intermediate express power efficiently for the rest of their careers.

As first built the engines had domeless taper-boilers with a tube heating surface of

*Later reduced to 189 when 2 locomotives were rebuilt to Class 6P. (See Page 104).

1462.5 sq ft, a firebox heating surface of 162.4 sq ft and a superheater heating surface of 227 sq ft. The grate area was 29.5 sq ft. The working pressure was 225lb per sq in, and the tractive effort at 85 per cent boiler pressure was 26610 lb. As modified, after a series of attempts with various combinations of 2- and 3-row superheaters; different tube proportions and different blastpipe sizes, the final boilers had a tube heating surface of 1460 sq ft, a firebox heating surface of 181 sq ft, and a 24-element superheater provided a heating surface of 300 sq ft. The grate area was increased to 31.0 sq ft. The total evaporative surface was 1641 sq ft. The blastpipe diameter was reduced to $4\frac{7}{8}$ in.

All three 17 in by 26 in cylinders had separate sets of Walschaerts long-travel valve gear. The drive was divided; the inside cylinder was located well forward and drove the front single-throw crank axle, and the two outside cylinders drove onto the crank-pins in the centre pair of coupled wheels.

No less than four different tender designs were attached to this class. These were 4000 gallon and 3500 gallon (short wheelbase) versions of the Stanier tender, and the 3500 gallon Fowler tender; also a high flat-sided version of the Fowler tender, which eliminated the coal-rails. The Fowler tenders were off the Royal Scot class (except the high-sided variety) and were exchanged to provide the Scots with 4000 gallon Stanier tenders.

The Jubilees operated on all four divisions of the LMSR, although somewhat more route-restricted than the versatile 'Black Fives'.

The engines were built as follows:

Nos. 5552–5556	Crewe	1934
Nos. 5557–5593	North British	1934
Nos. 5594–5606	North British	1935
Nos. 5607–5646	Crewe	1934
Nos. 5647–5654	Crewe	1935
Nos. 5655–5664	Derby	1935
Nos. 5665–5681	Crewe	1935
Nos. 5682–5742	Crewe	1936

Nos. 5552–5664 were delivered with domeless boilers. Nos. 5665–5742 were built new with improved boilers, with separate dome and top feed.

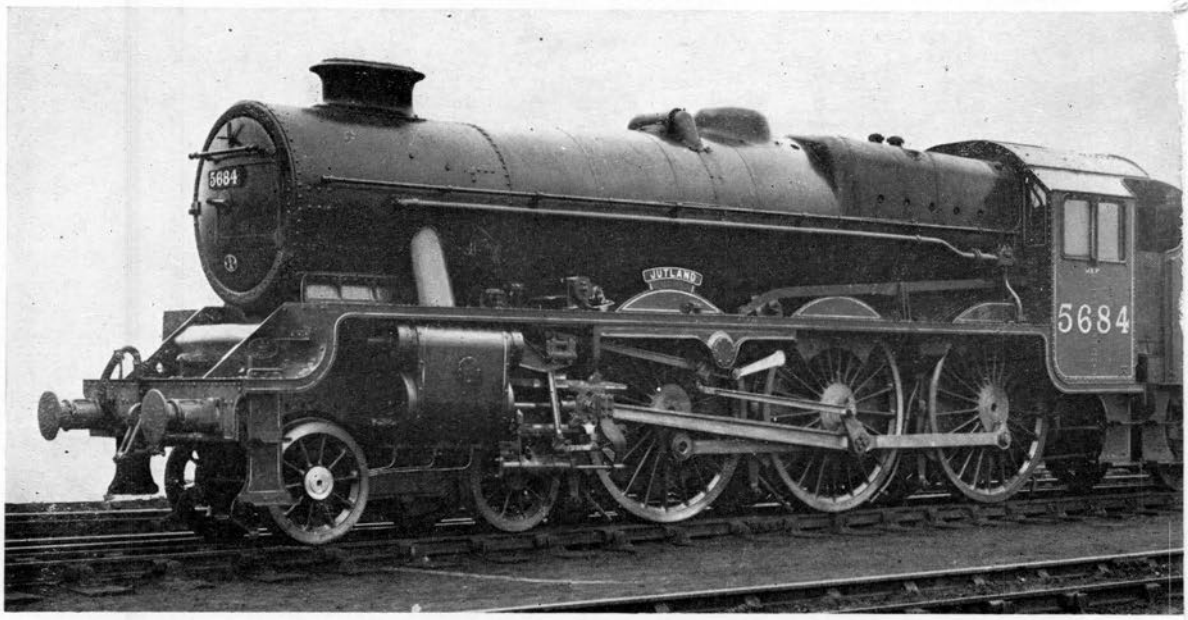
FIRST OF CLASS WITHDRAWN: 45637 12/52

EXAMPLES PRESERVED: 45593/6

Below. The first of the class, No. 5552 (un-named), in original condition with low-degree superheat domeless taper-boiler; at the head of a container train. The locomotive has a narrow 3500 gallon Fowler tender attached, in place of its original Stanier tender which was transferred to a Royal Scot 4-6-0. No. 5552 ran as such for some 4 months, then exchanged identities with No. 5642. [*Modern Transport*

Above. The second No. 5552 was built as No. 5642 and then exchanged identities with the original engine. Named *Silver Jubilee,* in honour of the Silver Jubilee of King George V it was finished in a special livery of glossy black embellished with chromium fittings, including the top-feed cover, the steam pipes, boiler bands, hand-rails and relief numerals and lettering. No. 5552 *Silver Jubilee* is seen here at Watford South on July 22, 1939 at the head of an up Blackpool and Fylde Coast express. [*E. R. Wethersett*

Below. In charge of a return excursion to Leicester, No. 5652 (un-named) is seen at Bushey on August 10, 1935. The engine is in original condition with domeless boiler, and with Stanier tender. Nameplates were attached to locomotives of the early batches after they had entered service. [*E. R. Wethersett*

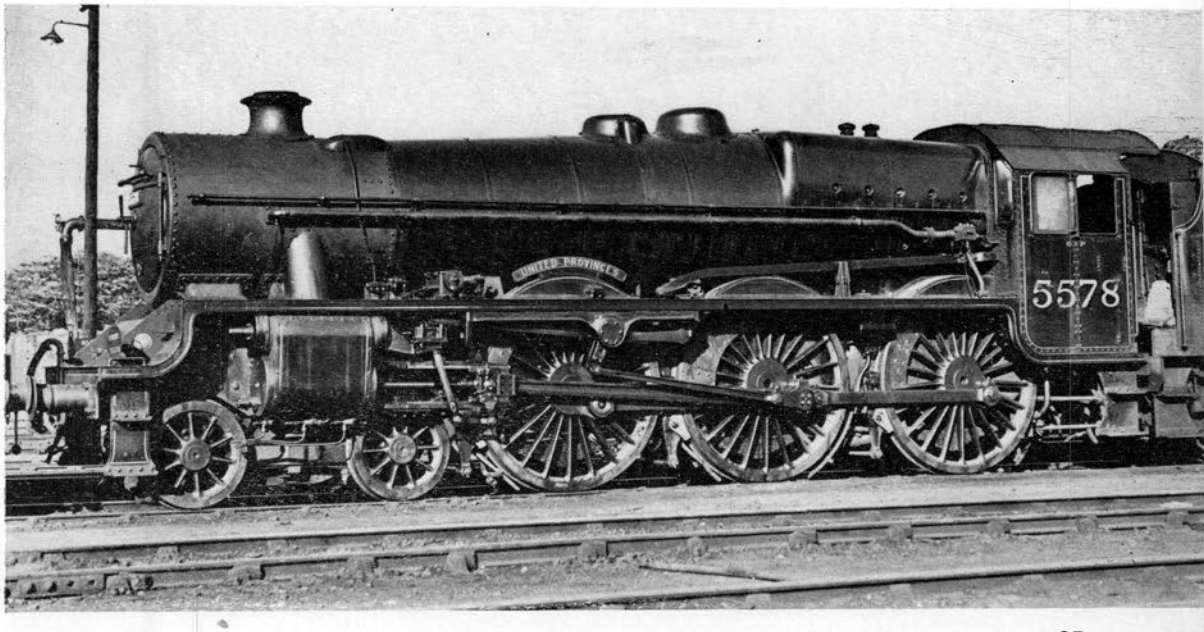


Above. From No. 5665 onwards, the Jubilees were built with improved boilers with dome and separate top feed. No. 5684 *Jutland* was fitted with an experimental Kylchap double blastpipe and chimney for a while, in 1937. In conjunction with incorrect tube proportions, a very real disadvantage over the orthodox single chimney was disclosed, in the form of excessive spark-throwing and build-up of ash in the smokebox. This double chimney arrangement was therefore quickly abandoned. [*BR*

Below. No. 5664 *Nelson* was the last of the engines to be delivered with a domeless taper-boiler, in 1935. By 1937, when this photograph was taken, it had received a new boiler with separate dome and top feed. Illustrated leaving Elstree Tunnel with the 2.30 pm St. Pancras–Kettering on June 5, 1937. [*E. R. Wethersett*

Above. Fitted with the high-sided version of the narrow Fowler tender, No. 5609 *Gilbert and Ellice Islands* was photographed leaving Bristol Temple Meads on the northbound 'Devonian', in pre-war days. [*G. H. Soole*

Below. A freak combination of boiler mountings. No. 5578 *United Province* with domed boiler, but with the original style of dome-shaped top feed casing placed forward of the steam dome proper; giving a double-domed effect.
[*P. Ransome-Wallis*



Above. The LMSR Mobile Testing Plant provided much valuable data on steam locomotive performance in post-war days. No. 5667 *Jellicoe* is shown attached to the train. It has the special corridor tender, and has wind gauges mounted ahead of the smokebox. [*BR*

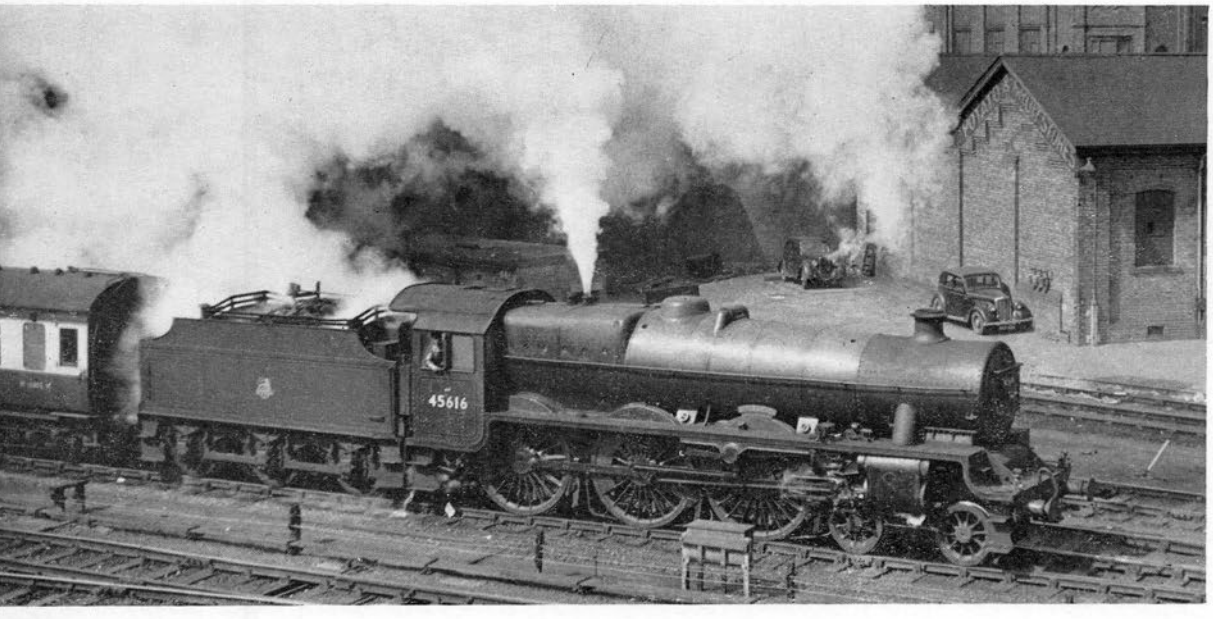
Below. Jubilee class 4-6-0 No. 5594 *Bhopal* had the distinction of being the only LMSR locomotive to receive crimson lake livery after the war. It was finished in an experimental style, with sans-serif lettering and numerals and was fully lined-out on one side only. At the same time another Jubilee, No. 5573 *Newfoundland,* was finished in an experimental blue-grey lined in maroon and gilt. No. 5594 (showing the plain crimson side) was photographed at the head of a South Wales–Manchester Saturday special, about to depart from Shrewsbury on July 5, 1947.

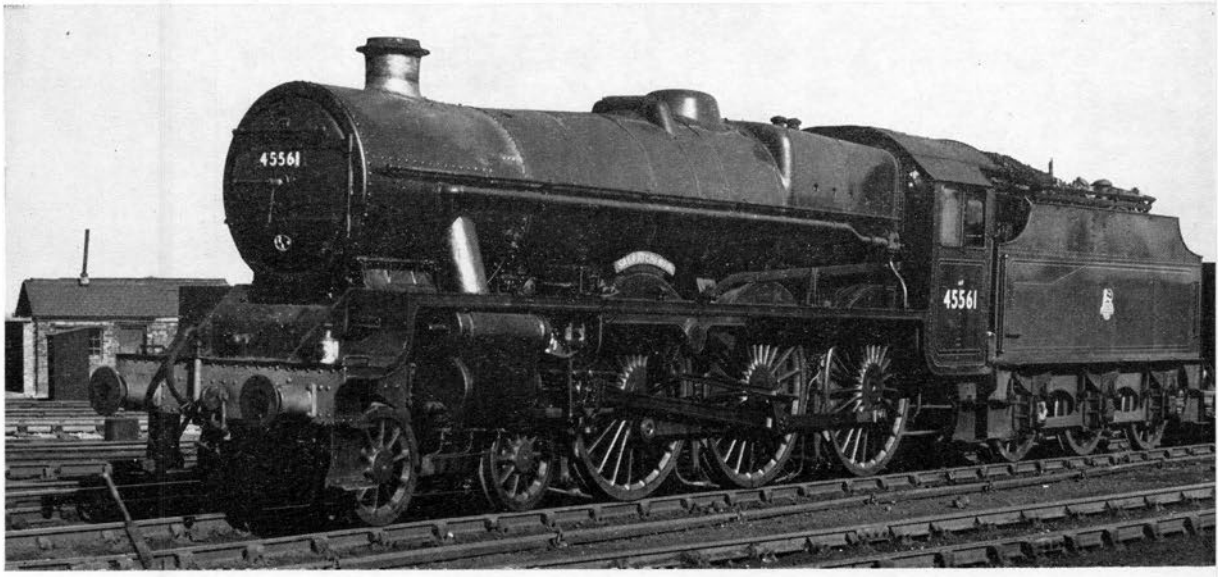
[*J. H. Platts*

Above. Until an easing of route-restrictions allowed Converted Scots and Britannias to operate over the Midland main-line, the Jubilees formed the mainstay of express power, ably assisted by the 'Black Fives'. No. 45694 *Bellerophon* makes a splendid picture as it leaves St. Pancras with the 4.50 pm down Bradford restaurant car express, on August 25, 1948. As part of experiments to determine new liveries for the nationalised railways, the engine was painted bright apple green with LNWR-style lining, and the carriages were in chocolate and cream. [*E. D. Bruton*

Above. No. 45719 *Glorious* is seen passing Bessy Ghill, near Thrimby Grange on the northern climb to Shap, with the 11.10 am Edinburgh Princes St.–Liverpool Exchange express. The engine is paired with one of the narrow high-sided Fowler 3500 gallon tenders. [*J. E. Wilkinson*

Below. In the late 1950s an exchange of tenders took place between Jubilees and 8F 2-8-0s. The Jubilees were given 4000 gallon Stanier tenders in place of the 3500 gallon Fowler tenders that some had previously run with. No. 45616 *Malta G.C.* still had a small Fowler tender when this photograph was taken as the engine left Leicester London Road with a northbound express, on April 21, 1956.
[*P. H. Groom*





Above. Chimney oddity on No. 45561 *Saskatchewan*; photographed at York. The usual Stanier pattern has been replaced by a standard BR casting, probably as a matter of expediency during overhaul. [*E. Treacy*

Below. In addition to No. 5684, already mentioned, at least four other Jubilees carried double blastpipes and chimneys at various times. Nos. 5553, 45596, 45722 and 5742. No. 45596 *Bahamas* was out-shopped from Crewe in 1961, fitted with a double blastpipe and chimney, and is seen here working a down Blackpool express past Carpenders Park, on August 15, 1964. [*P. J. Russell*

Section: 4 4-6-0 Class 5 Mixed-Traffic Engines

Introduced: 1934 Total: 842

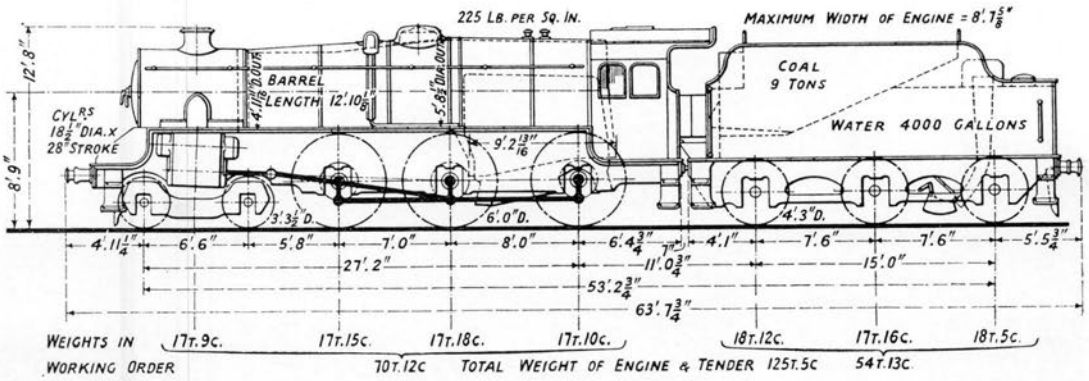
The need for a 'maid-of-all-work' mixed-traffic locomotive was high on the list of priorities when Stanier began to plan his range of standard LMSR designs. Capable of operating over virtually the whole system, on a wide variety of duties ranging from express passenger to branch line freight and stopping trains, the design would replace numerous pre-Grouping engines of widely different types. The finalised design, with very straightforward 2-cylinder layout, and incorporating the taper-boiler and other features introduced to the LMSR by Stanier, proved to be one of the most successful and popular classes of locomotive ever constructed. Contrary to popular belief, this was not the largest class of Stanier designed locomotives, being exceeded by 10 examples by the 8F 2-8-0s, of which—all told—852 were built.

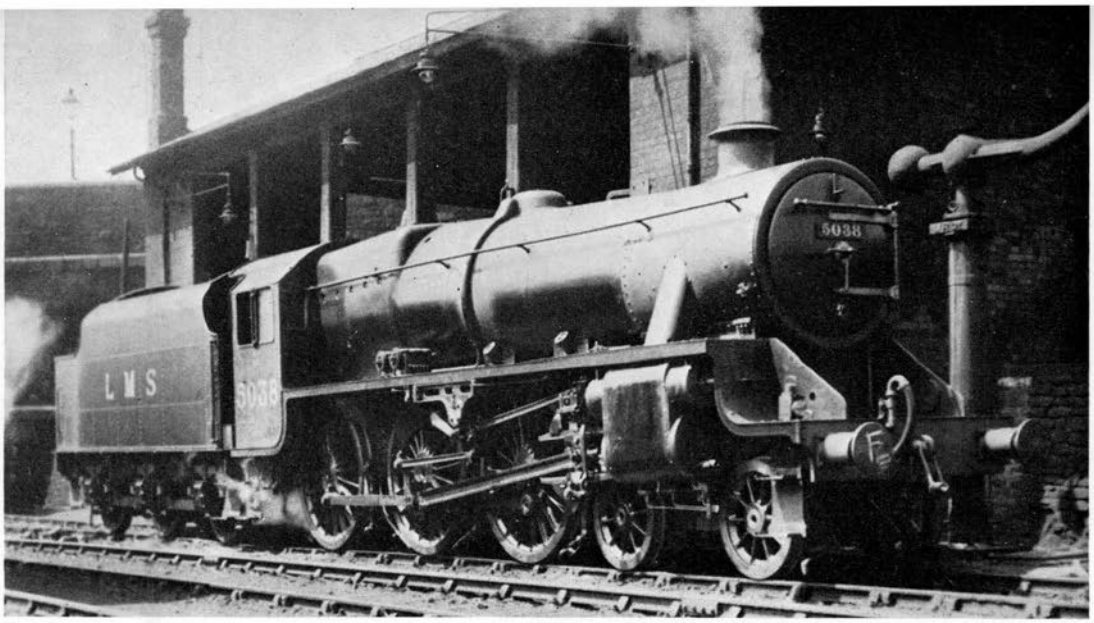
In common with early examples of his other designs of the 1933–35 period, the first Class 5s (or to use their now familiar nickname, 'Black Fives'), had domeless low-degree superheat taper-boilers and smoke-box regulators. Unlike the 5XP Jubilees, however, the steaming of even the initial low-degree superheat examples was excellent. But Stanier soon realised that what had proved adequate in power output and efficiency for Swindon locomotives, burning good Welsh coal, did not suffice under LMSR operating conditions.

As first built, there was a total evaporative heating surface of 1616 sq ft, comprising a tube heating surface of 1460 sq ft and a firebox heating surface of 156 sq ft. The superheater heating surface was 228 sq ft, and the grate area was 27.8 sq ft. Working pressure was 225 lb and the tractive effort at 85 per cent working pressure was 25455 lb. Two outside cylinders, 18½ in diameter by 28 in stroke, with Walschaerts long-travel valve gear, were provided.

Experience soon revealed the need to modify the design, as mentioned above,

Below. The drawing depicts the later boiler design.





Above. The first batch of 'Black Fives' to actually enter service were Nos. 5020–5069, built by Vulcan Foundry. These had low-degree superheat domeless taper-boilers, and at first they had the pipes to the top feed clacks outside the boiler cladding. The chimney was slightly taller than on later engines of the class. No. 5038 was photographed at Bristol on May 27, 1935, in original condition. [*H. C. Casserley*

and several boiler designs were tried. Finally, the superheater surface was increased to 348 sq ft, with 28 elements; the tube heating surface was increased to 1479 sq ft; the firebox heating surface was increased to 171 sq ft and the total evaporative heating surface became 1650 sq ft. The grate area was increased to 28.7 sq ft. These were the main changes made, but other variations existed with individual members of this extremely large class.

Construction proceeded steadily, and the class became a familiar sight practically everywhere on the LMSR system. With their moderate size, weight and length, the term ubiquitous has frequently been used to describe the 'Black Fives', with complete justification. After Stanier had finally retired from LMSR affairs in 1944, C. E. Fairburn continued with their construction, unchanged. When H. G. Ivatt succeeded Fairburn he introduced some modifications and also a number of experimental versions. But the basic design remained as Stanier had conceived it, and construction continued into the early years of the BR era.

The engines were built as follows:

Nos. 5000–5019	Crewe	1935
Nos. 5020–5069	Vulcan Foundry	1934/5
Nos. 5070–5074	Crewe	1935
Nos. 5075–5124	Vulcan Foundry	1935
Nos. 5125–5224	Armstrong Whitworth	1935

All these, Nos. 5000–5224 inclusive, were built with domeless boilers. All the locomotives listed below were built new with domed boilers and separate top feed.

Nos. 5225–5451	Armstrong Whitworth	1936–38
Nos. 5452–5471	Crewe	1938
Nos. 5472–5491	Derby	1943
Nos. 5492–5499	Derby	1944
Nos. 4800–4825	Derby	1944
Nos. 4826–4835	Crewe	1944
Nos. 4836–4860	Crewe	1944
Nos. 4861–4920	Crewe	1945
Nos. 4921–4931	Crewe	1946
Nos. 4932–4943	Horwich	1945
Nos. 4944–4962	Horwich	1946
Nos. 4963–4981	Crewe	1946
Nos. 4982–4990	Horwich	1946
Nos. 4991–4999	Horwich	1947

The locomotives built from late 1946 onwards incorporated certain refinements, such as self-cleaning smokeboxes, rocking grates and self-emptying ashpans. The following batches incorporated these modi-

Above. Another example of the first batch of 'Black Fives', delivered from Vulcan Foundry. No. 5042 seen working a Midland line express at Elstree. [*E. R. Wethersett*

fications and included a number of experimental versions by H. G. Ivatt. Certain engines were fitted with electric lighting.

Nos. 4768–4782 Crewe 1947
Nos. 4783–4799 Horwich 1947

Nos. 4758–4766 Crewe 1947
Fitted with Timken roller bearings. Nos. 4765/6 had double blastpipe and chimney.

No. 4767 Crewe 1947
Outside Stephenson link motion; double blastpipe and chimney; Timken roller bearings.

Nos. M4748–44757 Crewe 1948
Caprotti poppet-valve gear. Timken roller bearings. Nos. 44755–44757 had double chimneys.

Nos. 44738–44747 Crewe 1948
Caprotti poppet-valve gear. Plain bearings.

Nos. 44728–44737 Crewe 1949

Nos. 44718–44727 Crewe 1949

Nos. 44698–44717 Horwich 1948/9

Nos. 44688–44697 Horwich 1950
Timken roller bearings on the driving axles only.

Nos. 44686–44687 Horwich 1951
Caprotti poppet-valve gear; Skefko bearings; double blastpipe and chimney. (Last of class constructed).

Nos. 44678–44685 Horwich 1950
Skefko roller bearings.

Nos. 44668–44677 Horwich 1950
Skefko roller bearings on driving axles only.

Nos. 44658–44667 Crewe 1949

To accommodate the Timken cannon-type axleboxes under the ashpan, used on some locomotives, the trailing driving wheels on these final batches were moved 4 in back. On the Caprotti engines the boiler was raised 2 in higher.

As already mentioned, the 'Black Fives' were to be found virtually all over the system, and they were also favourite motive power for through workings with excursion trains to 'foreign' destinations such as the South Coast resorts. In certain places turntables had to be lengthened before they could be accommodated.

FIRST OF CLASS WITHDRAWN:
45401 11/61
EXAMPLES PRESERVED: 44767 44806 44871 44932 45000 45025 45110 45212 45231 45305 45407 45428

Above. The later domeless engines had a smaller chimney, and the pipes to the top feed clacks were recessed into the boiler cladding. Nos. 5125–27 were photographed at an official handing-over ceremony from Armstrong Whitworth, in 1935. [*Modern Transport*

Below. Another view of an Armstrong Whitworth example with domeless boiler. No. 5160 was photographed in the Highland yard at Perth, with tablet-catcher on the cabside. The engines soon gained an excellent reputation for hard work over the difficult Highland routes. [*BR*

This page:

Above. From No. 5225 onwards, all 'Black Fives' were built new with improved boilers; with separate dome and top feed. No. 5232 was photographed at Oxenholme in pre-war days, with a down passenger train. The tenders for the class were of standard Stanier pattern, with curved high sides, although early drawings showed a Fowler tender. The capacity was 4000 gallons and 9 tons. First livery of the class was black, with red lining, and it was this that gave them the nicknames 'Black Staniers' or 'Black Fives', to distinguish them from the crimson lake 5XPs. [*F. R. Hebron*

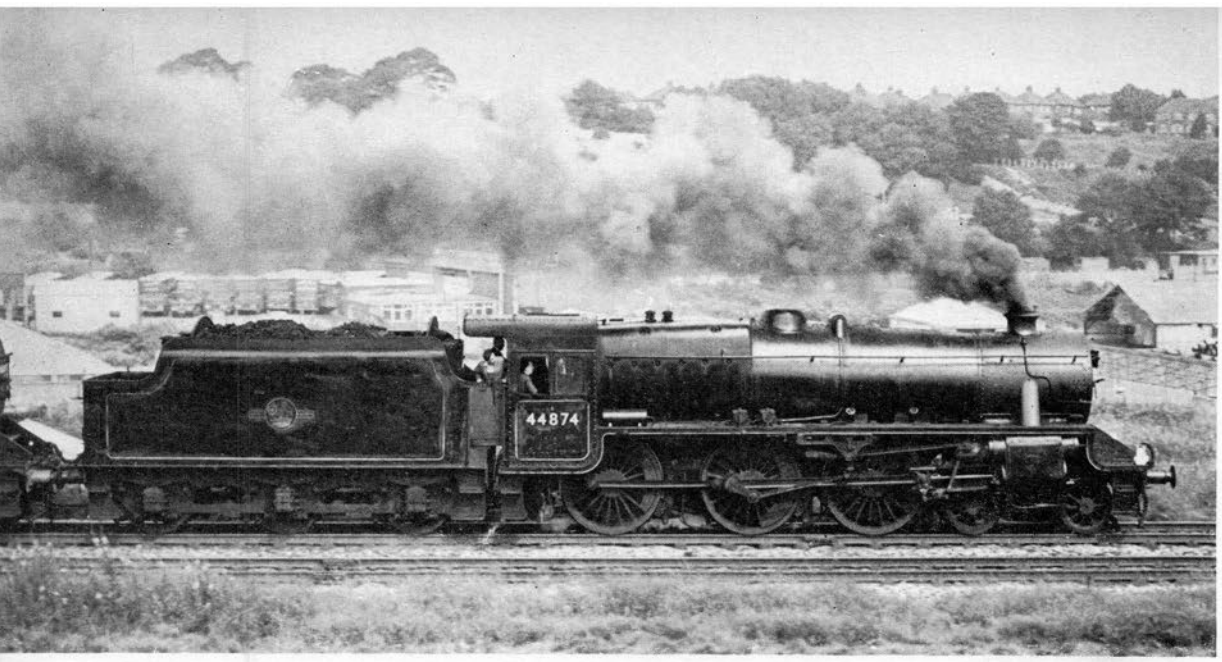
Opposite page:

Top. This domeless example has the later type of top feed casing instead of the more usual dome-shaped version. Seen here heading a northbound ballast train through Dumfries on June 25, 1963 is Class 5 4-6-0 No. 45192. [*D. Cross*

Bottom. Boilers were swapped around frequently when an engine went into works for heavy repair. An example is this Ivatt-version boiler (with top feed moved nearer the chimney) carried by an earlier Stanier-built locomotive. No. 45469 was double-heading with No. 44702 on an Edinburgh-Greenock Special, when it was photographed at Currie on May 9, 1964. [*D. Cross*

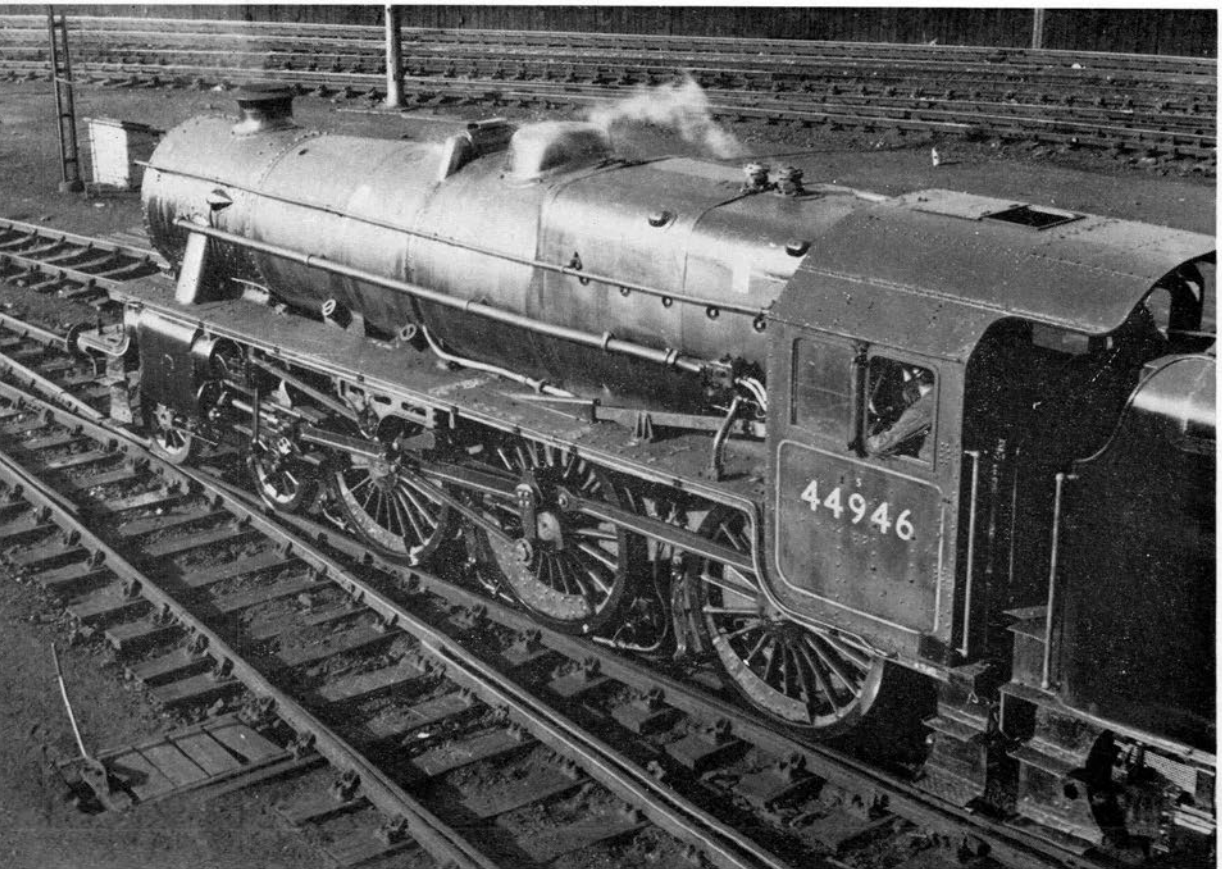
45192

45469
1281



Above. A broadside view of 'Black Five' No. 44874 (double-heading with No. 45017) as it climbs towards Standedge Tunnel, near Clayton Bridge, with an SLS railtour from Birmingham on August 4, 1968. [*M. Shackleton*

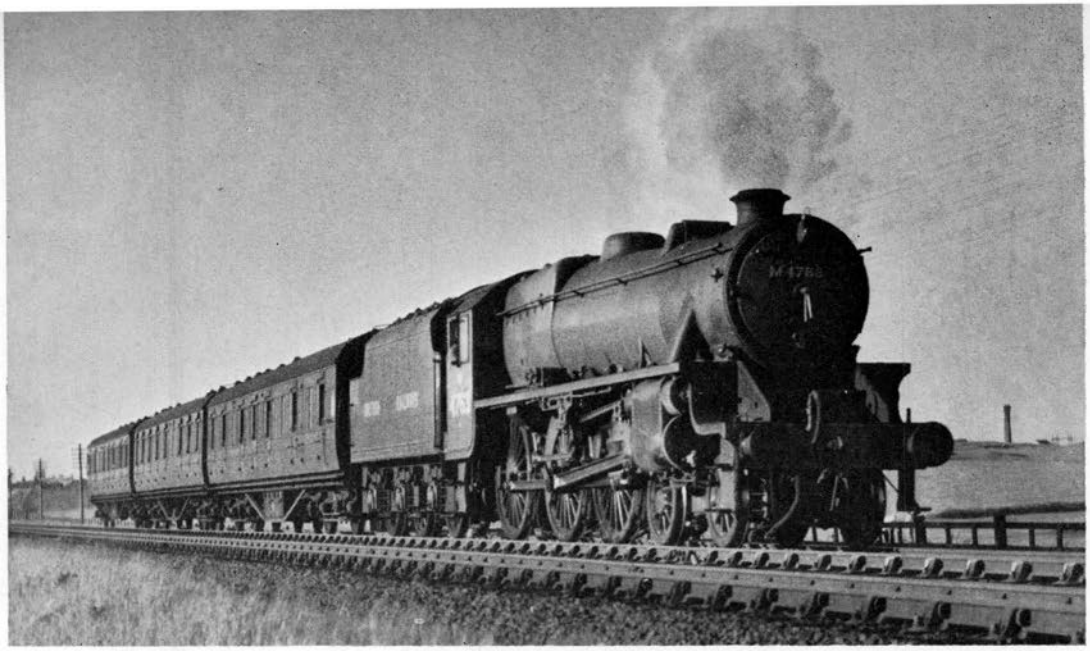
Below. An unusual angle to view a Class 5, which emphasises the clean lines of the design. No splashers were necessary as (except on the Caprotti engines), the running-plate cleared the 6 ft driving wheels. No. 44946 was photographed at Patricroft. [*J. R. Carter*



Above. Four of the class were named in LMSR days (a fifth was widely rumoured to have carried the name *Queen's Edinburgh*, but this was never officially confirmed). This superb night scene shows No. 45156 *The Ayrshire Yeomanry*, still with domeless boiler, standing in Patricroft shed yard before leaving for the last time, when Patricroft was closed down, on May 29, 1968. [*J. R. Carter*

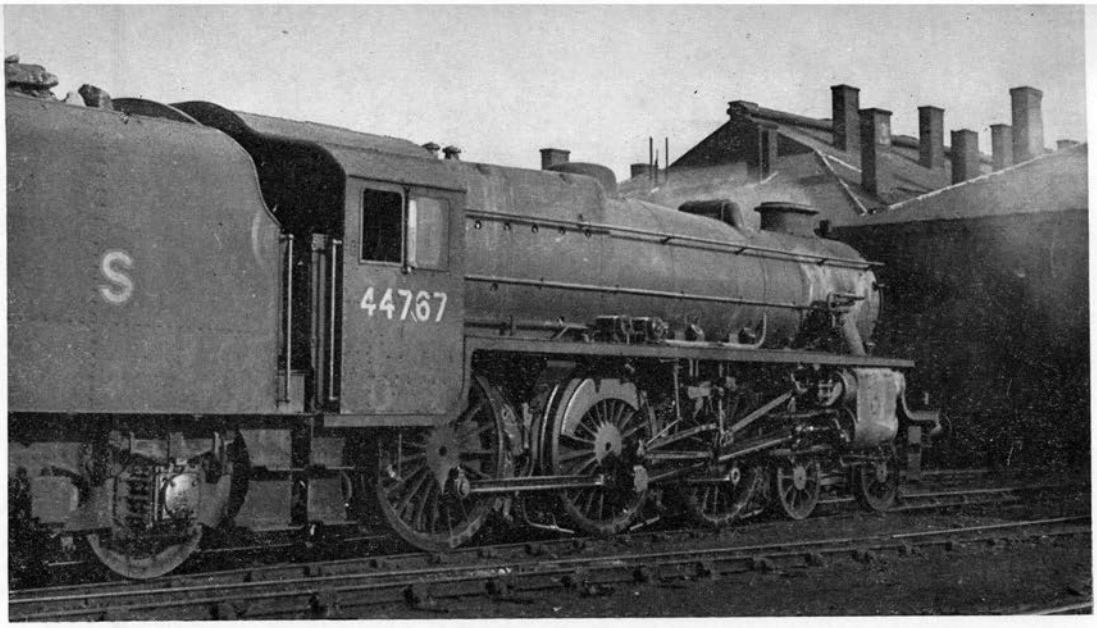
Above. 'Black Five' No. 45253 took part in the 1948 Locomotive Exchanges; with highly satisfactory results. It is seen here leaving Parson's Tunnel, Dawlish, with a Bristol–Plymouth express, whilst operating on the Western Region.
[*E. Oldham*

Below. Temporary withdrawal of the Merchant Navy class Pacifics on the Southern Region, following discovery of a serious defect, resulted in the loan of seven 'Black Fives' to the SR in 1953, together with other classes. No. 45051 was photographed at Brookwood with the second portion of the 3.0 pm down West of England express from Waterloo on May 23, 1953. [*R. W. Beaton*



Above. As already mentioned the class gained its nickname from the black livery carried. In fact only three examples were ever painted any other colour. These were selected to display proposals for a new BR livery, in 1948. No. **M**4762 was finished in Southern Railway malachite green; No. **M**4763 was in LNER apple green, and No. **M**4764 was in GWR brunswick green. They were fully lined-out on one side only, and displayed at Kensington Addison Road; afterwards going into normal traffic. No. **M**4763 is illustrated, working the 7.45 pm Llandudno–Chester stopping train, near Maes Du, on June 8, 1948. [*E. D. Bruton*

Below. No. 44971, paired with a self-weighing tender, photographed attacking the 1 in 100 to the Ship Canal Bridge, as it crosses the River Mersey at Walton New Junction; May 2, 1956. [*D J. Thomas*

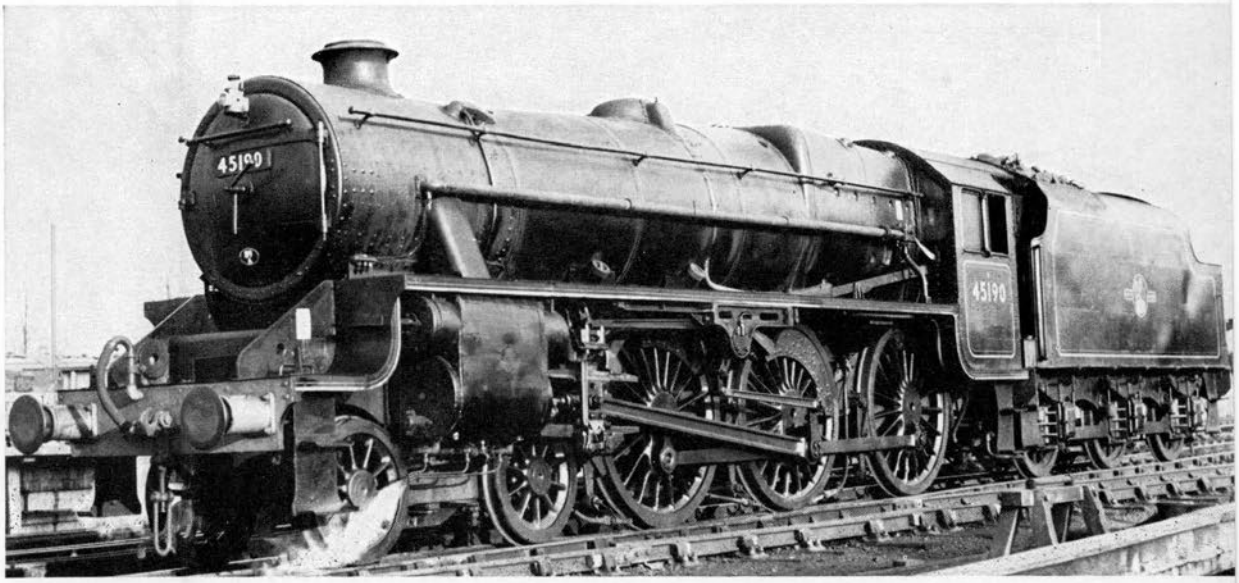


Above. Rear ¾ view of No. 44767, the unique engine constructed with outside Stephenson link motion, Timken roller bearings and double chimney. Photographed at Crewe on May 7, 1949. [*H. C. Casserley*

Below. 'Black Five' No. 44766 at Bangor on August 6, 1952 with a Bank Holiday excursion from Manchester. One of two engines with double chimney and Timken roller bearings. Note the electric lighting and headcode discs. [*E. Treacy*

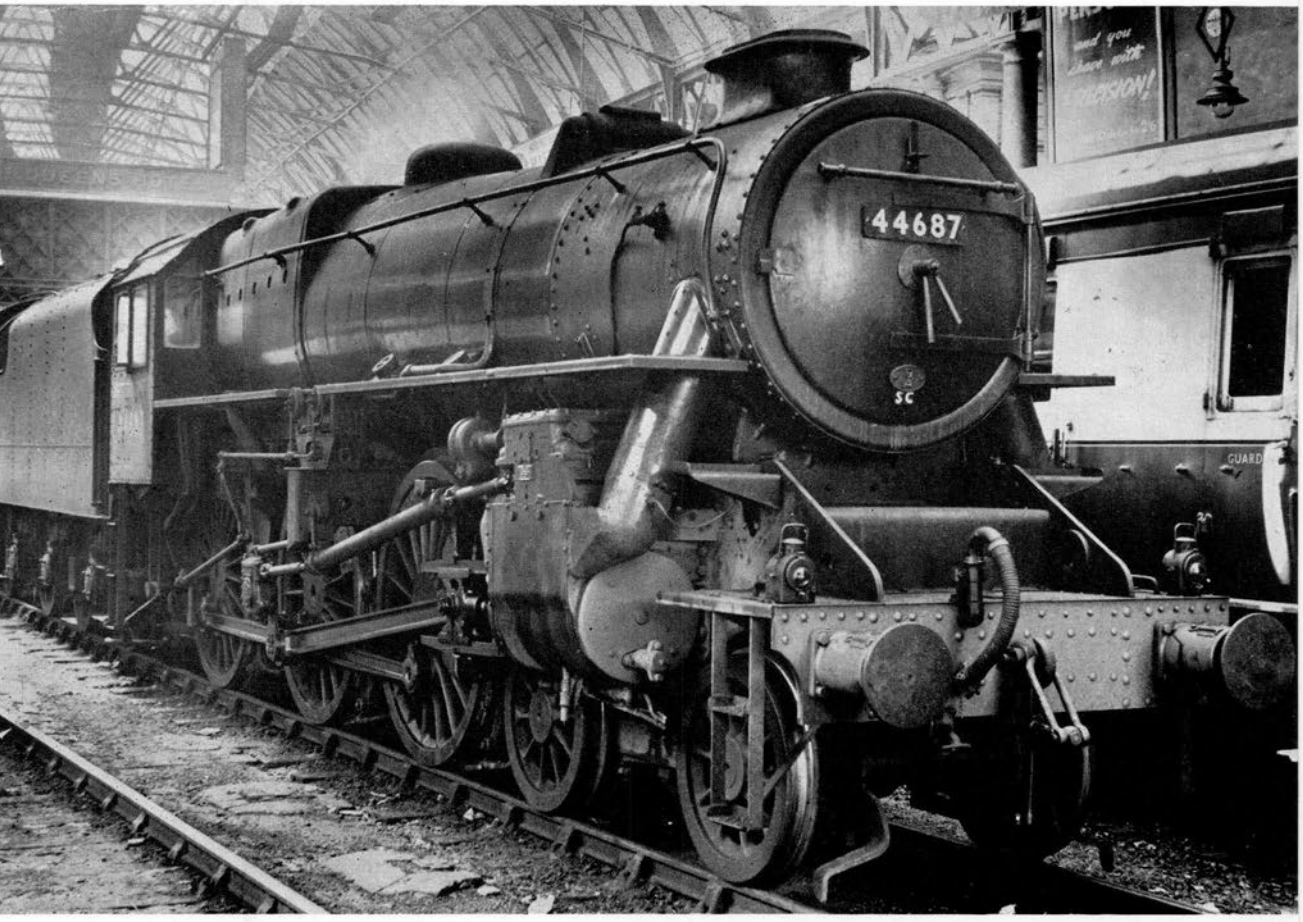
Above. As finally running in BR days, No. 44767 had a single chimney and blast-pipe, and the electric lighting originally fitted was removed. Photographed at Carnforth shed on July 8, 1967. [*C. E. Weston*

Below. Many 'Black Fives' survived their entire career with domeless boilers, but with improved heating surfaces. No. 45190 is illustrated, in BR lined black livery. [*J. B. Bucknall*



44749
30

14756



Opposite page:

Top. In clean lined black livery, No. 44749 makes a pleasing picture at Dillicar near Tebay, with a Carlisle–Crewe parcels train; September 9, 1959. One of a batch delivered in 1948 from Crewe with Caprotti poppet-valve gear and Timken roller bearings. [*J. E. Wilkinson*

Bottom. In addition to Caprotti poppet-valve grear and Timken roller bearings, three locomotives, Nos. 44755-57, were built with double blastpipes and chimneys and electric lighting. No. 44756 was photographed passing Bingley, Yorks., with the down 'Thames–Clyde Express'. [*W. Hubert Foster*

This page:

Above. Final 'Black Five' variant by H. G. Ivatt, with Caprotti poppet-valve gear, Skefko bearings and double chimney; built at Horwich, 1951. The raised running boards drastically altered the appearance of the engine, and foreshadowed the design of the later BR Standard classes. No. 44687 was photographed at Birmingham New Street, at the head of the 'Pines Express' in June 1951. [*A. W. Flowers*

Section: 5 2-6-4T Class 4P Passenger Tank Engines

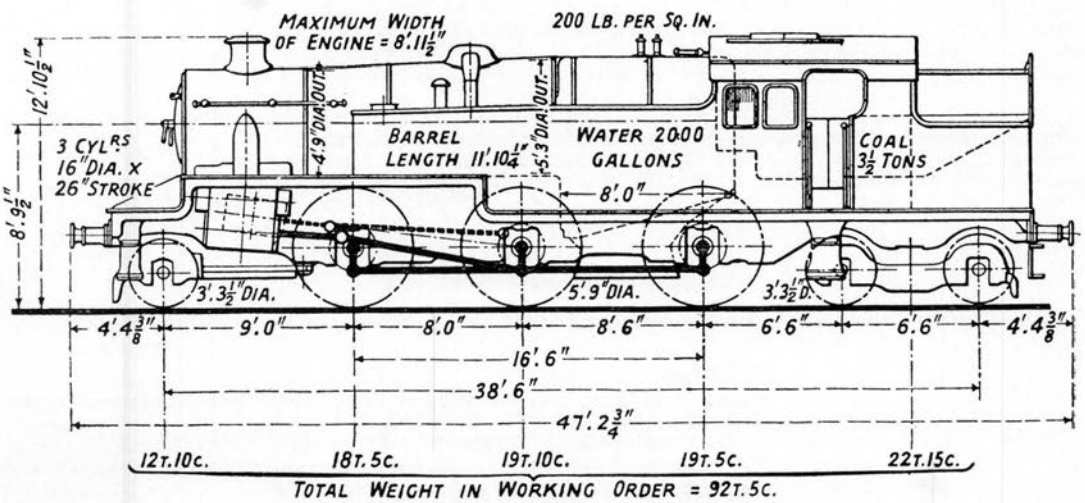
Introduced: 1934 Total: 37

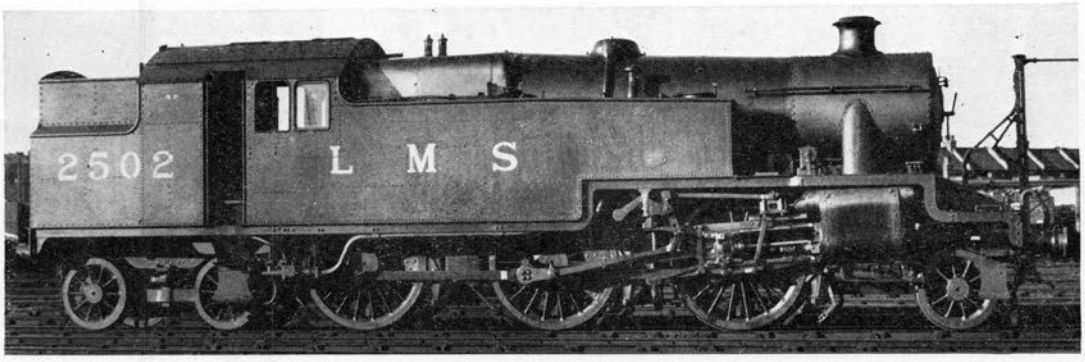
Designed to meet a specific and urgent need for new power for the Southend line, these massive tank engines had a 3-cylinder arrangement which, it was believed, would provide high acceleration. Subsequent experience proved that the earlier Fowler design of 2-6-4T, which had a straightforward 2-cylinder layout, was capable of equal performance, and later Stanier 2-6-4Ts were of 2-cylinder type (see page 76). Nevertheless the 3-cylinder series were well liked by their crews and they were the mainstay of the Southend line services for many years.

The design in general followed the new practice initiated under Stanier's direction; with a domeless low-degree superheat boiler and Walschaerts long-travel valve gear. As built, the boilers had a heating surface of 1137 sq ft, comprising a tube heating surface of 1000 sq ft and firebox heating surface of 137 sq ft. The superheater heating surface was 153.5 sq ft. The grate area was 25 sq ft. Tractive effort at 85 per cent of the boiler pressure was 24600 lbs. Modifications to the boiler later raised the total heating surface to 1265 sq ft, with the superheater heating surface increased to 185 sq ft, the tube heating surface increased to 1126 sq ft, and the firebox heating surface increased to 139 sq ft. Drawings issued in late LMSR days showed the class fitted with domed boilers, but it is believed that most—if not all—the 37 engines remained domeless for their entire working lives.

The three 16 in by 26 in cylinders all drove the centre coupled axle; the two outside cylinders had two-bar crossheads but the inside cylinders had a single-bar arrangement.

Although the class will always be associated with the Southend line, they did in fact wander much farther afield from time to





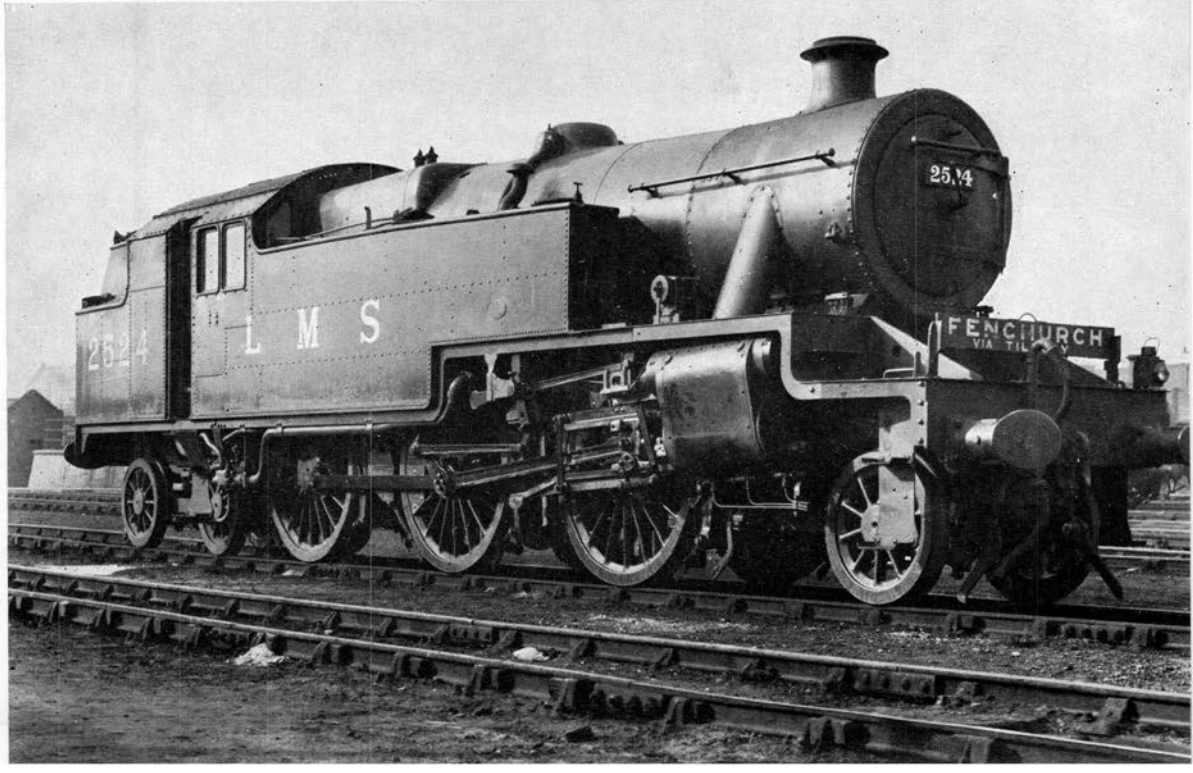
Above. The first 10 locomotives had straight sides to the bunker tops, a feature clearly discernible in this view of No. 2502. [*P. Ransome-Wallis*

time. When new, the first 5 locos were allocated to Watford for suburban duties out of Euston and Broad Street, and during World War 2 there were examples allocated to Kentish Town, Cricklewood, Derby, Nottingham, Kirkby, Manningham and Saltley. In 1951 two examples were transferred on loan to the Scottish Region in exchange for two Fairburn 2-6-4Ts; Nos. 42530/5 were allocated to Greenock (Ladyburn). No water pick-up gear was fitted to these engines.

The entire class was built at Derby in 1934.

FIRST OF CLASS WITHDRAWN:
42512 12/60
EXAMPLE PRESERVED: 42500

Below. Nos. 2500–2524 were constructed with full-length cab doors, similar to the final batch of the Fowler 2-6-4Ts. Complaints of excessive heat resulted from this, and the final batch of 12 had modified cabs. No. 2524 was photographed at Plaistow on April 6, 1935, with characteristic LTSR line destination board above the buffer beam. [*E. R. Wethersett*

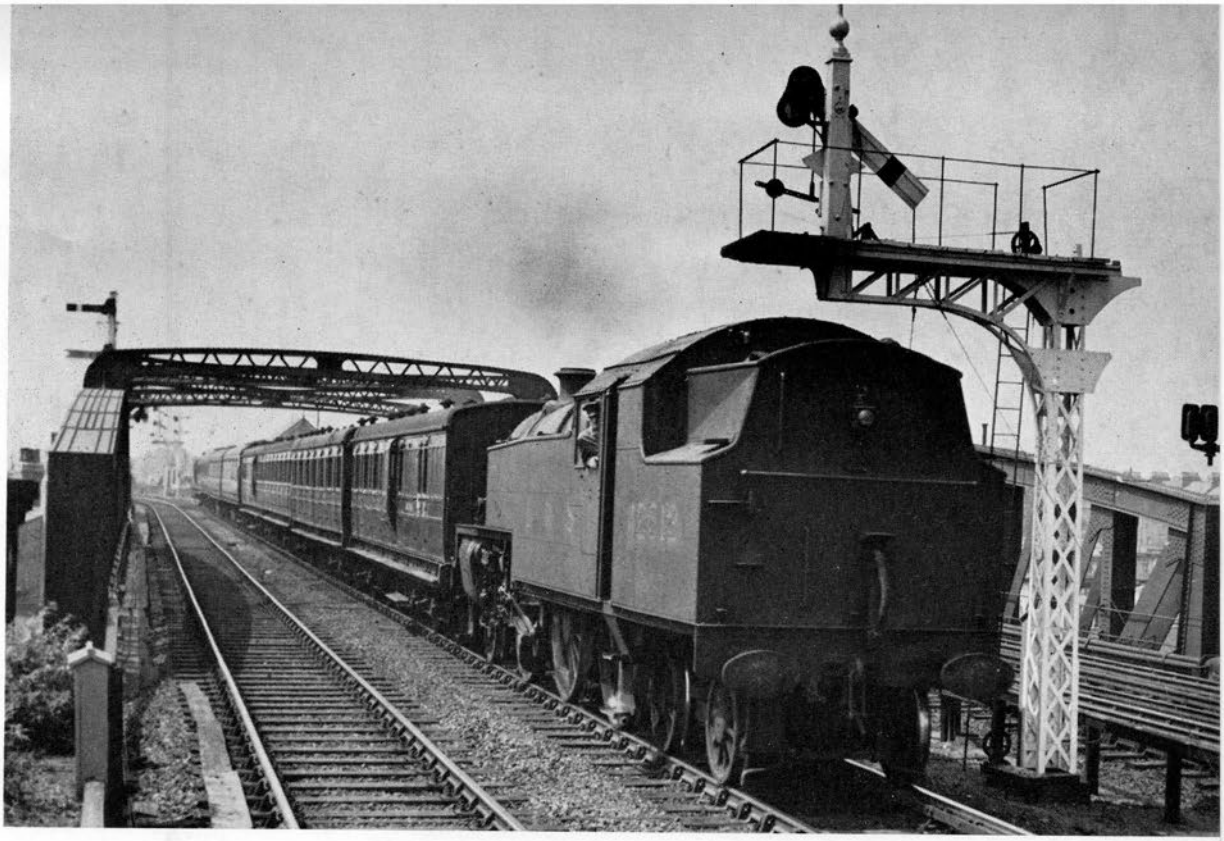


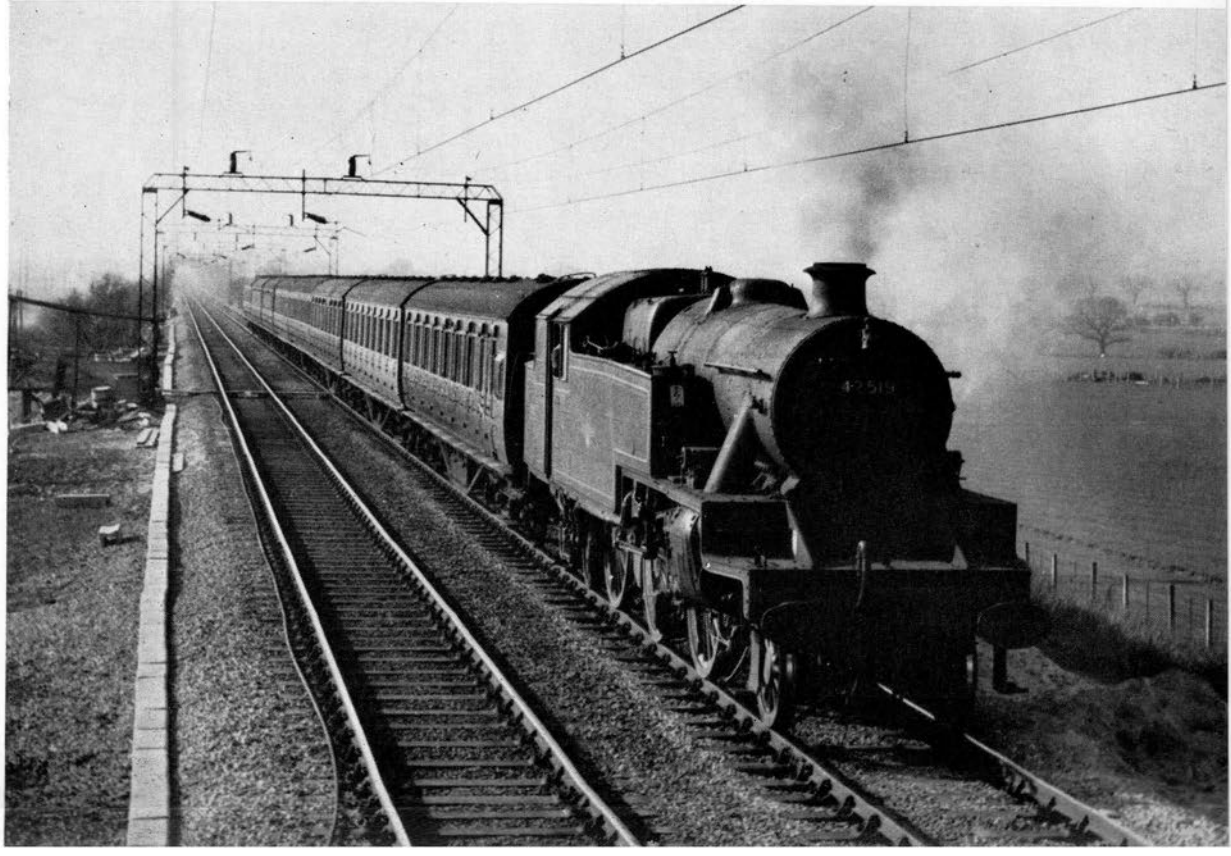
Above. No. 2531, heading towards Fenchurch Street on a typical LTSR train of non-corridor stock, in the late 1930s. This was one of the final batch of 12 locomotives with revised cab design, with a cutaway section in the rear cab side sheets, and waist-high doors. [*E. R. Wethersett*

Opposite Page:

Top. To improve vision when running bunker first the sides of the bunker tops were cranked inwards on all engines from No. 2510 onwards (and on the later 2-cylinder version). This feature is clearly shown in this picture of No. 42512 working bunker first on a Fenchurch Street–Tilbury train, passing Campbell Road Junction; July 21, 1951. The four leading carriages are ex-LTSR stock. [*P. T. Lynch*

Bottom. Final days of steam on the Southend line. Under 25 kv catenary, No. 42519 in BR lined-black livery is seen ascending Laindon bank, at Dunton, on March 4, 1961, at the head of the down 2.25 pm slow. Note that the angled air-vent pipes have been removed from the top of the side-tanks. [*P. J. Paton*





6202

Section: 6 4-6-2 Class 7P
Express Passenger Engine

Introduced: 1935 Total: 1
Turbomotive

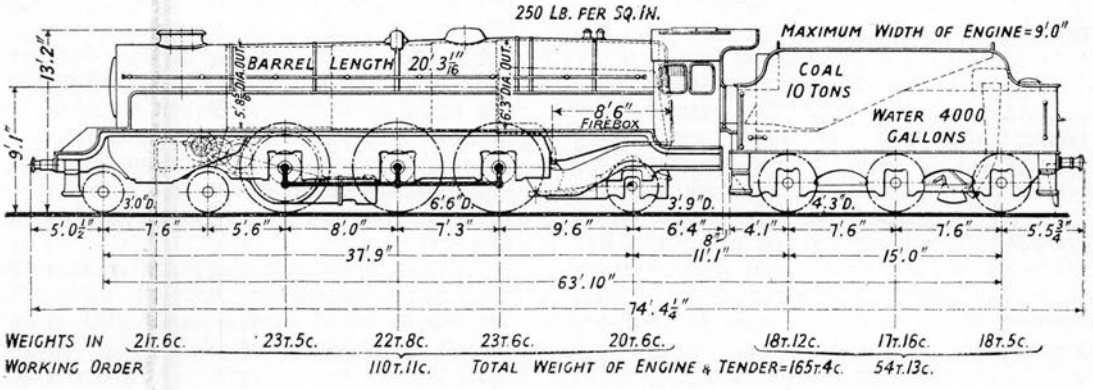
Stanier's sole venture into the field of unconventional motive power, the Turbomotive (as it became popularly known), was all the more remarkable for having one of the longest and most successful careers of any experimental locomotive produced this century.

It was the success of a non-condensing turbine locomotive of the Ljungstrom type, on the Swedish Grangesburg—Oxelösund Railway, in 1932, which prompted the LMSR experiment. Stanier visited Sweden to see the engine at work, together with a representative of the Metropolitan-Vickers Company, which also had an interest in the progress being made in Sweden.

As already mentioned on page 18, the LMSR had originally planned to construct three prototype Princess Royal class Pacifics at Crewe in 1933. But following the favourable impression made by the Swedish turbine locomotive, the decision was taken to cancel the third orthodox engine, and to produce instead a non-condensing turbine engine.

The boiler, wheels, frames and numerous mechanical parts were basically similar to the Princess Royal class, but in other respects the Turbomotive was radically different. The contract for the turbine equipment was placed with Metropolitan Vickers, and the locomotive was completed at Crewe in June 1935, at a cost of £20383, compared to £8538 each for the second batch of Princess Royals, Nos. 6203–6212. Although the Turbomotive

Opposite. Prior to entering service the Turbomotive showed her paces before the press cameras, on June 28, 1935, at Camden. As first built the engine had a domeless boiler of similar dimensions to those fitted to the second batch of Princess Royal 4-6-2s, Nos. 6203–12, with a 32-element superheater, but the layout of small tubes was different. [*Author's collection*



Above. This shot of the Turbomotive shows the second boiler, with steam dome and separate top feed, and the long casing housing the large forward turbine. Photographed at Camden. [*P. Ransome-Wallis*

was allocated No. 6202 in the Princess Royal class, it was never officially named.

The principle of turbine drive was one which allowed an even torque on the driving axle, thereby eliminating the hammer-blow which was a usual characteristic of conventional cylinders and reciprocating valve motion. (Actually some reciprocating locomotives had nil hammer-blow). Thus a greater proportion of the total weight of the engine was available for adhesion. An axle load of 24 tons (later reduced to 23.3 tons) was permitted, compared with a maximum of $22\frac{1}{2}$ tons for conventional steam, and roller bearings were fitted throughout to engine and tender. The tender was of standard Stanier design.

As no condenser was fitted there was a reduced theoretical thermal efficiency, but this allowed a considerable simplification in design. There were two turbines, at the front of the engine. The main turbine, for forward running, was located on the left-hand side and had a shaft horsepower of 2000 when using steam at 250 lb pressure and with a temperature of 750 deg F. A treble reduction gear of the double helical type, permanently in mesh, transmitted to the torque to the leading coupled driving wheel. The reverse turbine was located on the right-hand side, and was much smaller. The reverse turbine was normally idle and could only be brought into use when the engine was stationary, by means of a dog clutch. When the reverse turbine was in action the steam supply to the forward turbine was cut off, and the blades idled in the opposite direction. Steam entered the turbine by means of six valves, capable of being opened or closed one-by-one from the driver's controls in the cab. The number of valves open was varied to suit the power demand.

All the transmission shafts and gears were enclosed in a suspended case and lubricated by means of a closed force-feed oiling circuit, activated by three pumps, two of which were steam driven and worked con-

tinuously, even when the locomotive was stationary. Steam for train heating was bled-off the turbine exhaust. As no condenser was employed, the turbine exhaust was turned-up through the chimney, and provided draught for the fire. But because of the low pressure of the turbine exhaust an automatically variable double blastpipe and double chimney was found to be necessary.

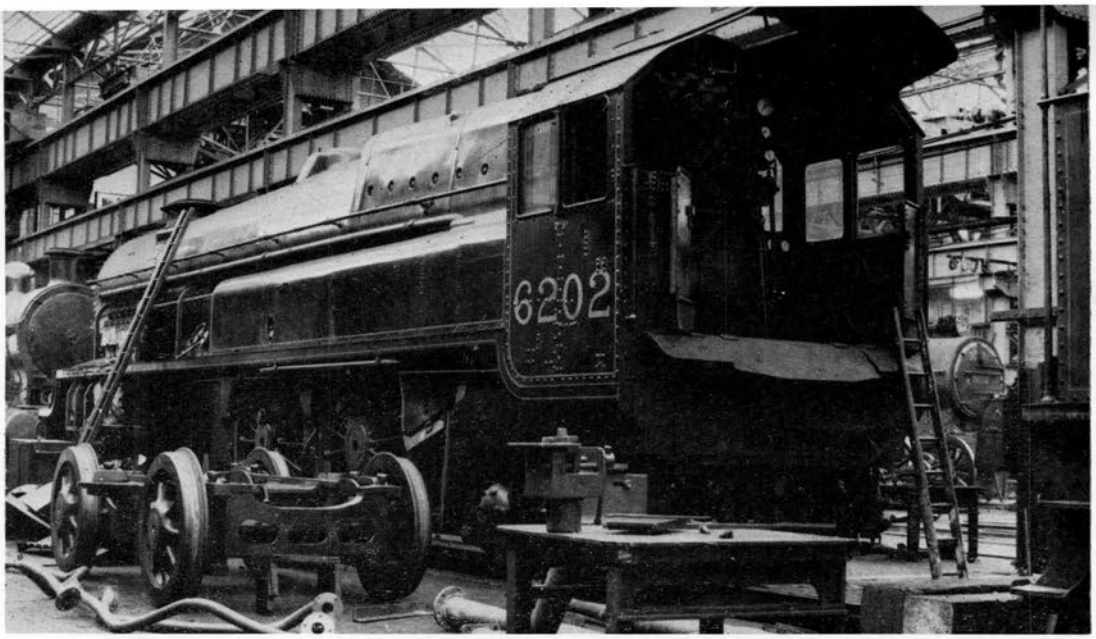
Externally the Turbomotive was one of the neatest modern steam locomotives, although it would be true to say that it had a definite 'best side'—the left-hand side, with the long casing housing the forward turbine. In his book *The Locomotive* (Studio, 1937) the American industrial designer Raymond Loewy was lavish indeed with his praise, describing it as '. . . one of the most beautiful pieces of machinery ever designed by man'. He went on to say that: 'It has the poise, the rhythm and the balance reminiscent of some magnificent ship. This engine probably represents the apex of the pre-streamlined age'.

Intensive early trials were carried out on the Anglo-Scottish services, in comparison with the Princess Royals, but for the majority of its life, the locomotive was employed on the Euston–Liverpool run.

The experiment came to an end when the locomotive required extensive renewals including a new main turbine, which would have involved considerable expense. The decision was therefore taken to rebuild her conventionally. As BR No. 46202, and named for the first time, *Princess Anne* (thus becoming the Princess Anne type; *not* a Princess Royal), she emerged from Crewe in the summer of 1952. A 'new' Stanier locomotive produced under BR auspices, with a handsome appearance. In her new form the locomotive was destined to have a tragically short career. Less than three months in service, she was one of the locomotives involved in the Harrow disaster. Damage was sufficiently severe to warrant withdrawal, although the boiler was repaired and used again.

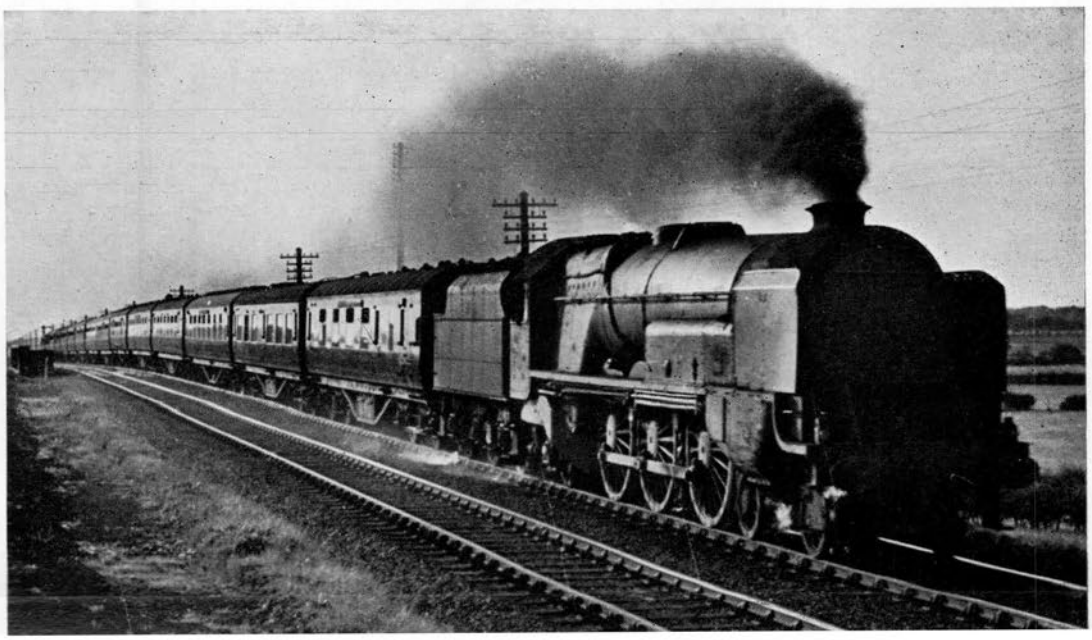
REBUILT 1952 WITHDRAWN 5/54

Below. The reverse turbine proved to be a troublesome feature, and was the cause of a number of failures in service. Much smaller than the forward turbine, it was intended for slow speed running only, and was normally used only when the engine was running light or shunting. It proved too small to allow the engine to push its empty stock up Camden bank to the carriage sidings outside Euston. In view of this, the illustration now reproduced is all the more remarkable as it shows No. 6202 running tender-first on the up main-line at Bushey with a nine coach load The reasons for this highly unusual operation are not known. [*E. R. Wethersett*



Above. The Turbomotive inevitably paid the price of being a one-off experiment. Turbine failures were likely to involve a visit to works for rectification by experts, and time was often wasted whilst special replacement parts were obtained. On the credit side, the locomotive put up many splendid performances in everyday service and it was generally well-liked by enginemen once they had grown accustomed to its unusual features. In the hectic early war years this specialised machine was stored out of service at Crewe, but was reinstated in 1942. When again out of service in 1943 (as a result of turbine damage) its boiler was used on No. 6210. The illustration shows No. 6202 under repair at Crewe whilst still fitted with the original domeless boiler. [*Photomatic*

Below. Trouble was experienced with the soft turbine exhaust drifting in front of the cab windows and as a result No. 6202 was the first LMSR Pacific to receive smoke-deflectors, in 1939. This postwar view of the Turbomotive shows the extended casing of the right hand reverse turbine, which housed a Worthington reciprocating oil pump, fitted in 1942. In this final condition the locomotive had a 40-element superheater, with triple elements, which increased the superheated surface to 832 sq ft. A novel feature of the locomotive was the manner in which it quietly moved along; seemingly effortlessly. [*R. Whitfield*



Above. Running and repair costs rose sharply during the difficult war years and the immediate postwar years, and although acknowledged as a most worthwhile experiment, it was decided to rebuild the locomotive as a conventional Pacific. As BR No. 46202 *Princess Anne* she emerged from Crewe in August 1952, and is seen here receiving final attention before leaving the works yard. The front end layout resembled the Coronation Pacifics, rather than the Princess Royals, and the engine was therefore designated the Princess Anne type. It only ran 11443 miles before it was damaged beyond economic repair in the Harrow disaster of October 1952.

[*Modern Transport*

Section: 7 2-8-0 Class 8F
Heavy Freight Engines

Introduced: 1935 Total: 852

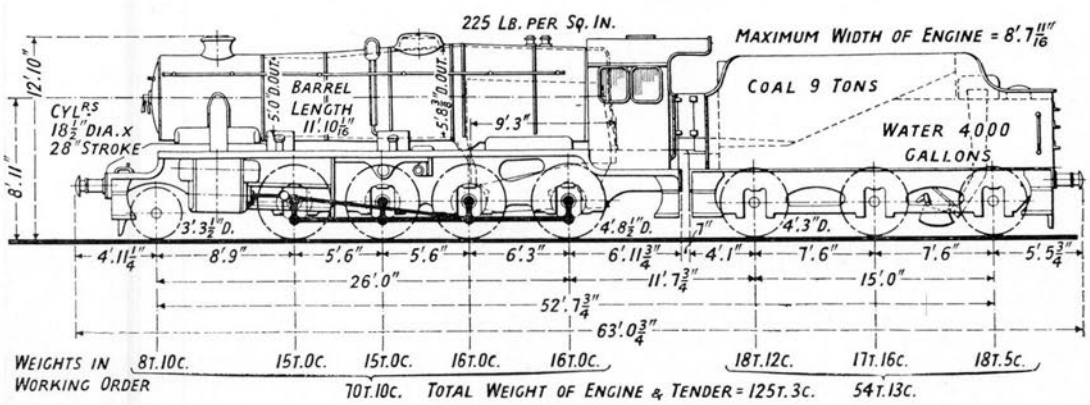
Although Fowler had produced some 2-8-0s for the Somerset and Dorset Joint Railway, which later became part of the LMSR locomotive stock, these heavy freight engines designed by Stanier were the first really modern locomotives of that wheel arrangement to operate over the lines of the constituent companies of the LMSR.

The initial batch of 12 locomotives had domeless taper-boilers, and were at first classified 7F. All later examples had improved boilers, with separate dome and top feed, and were classified 8F; the first 12 eventually being brought into line with the rest.

The original boilers had a total evaporative heating surface of 1463 sq ft, comprising a tube heating surface of 1308 sq ft and a firebox heating surface of 155 sq ft. The superheater heating surface was 230 sq ft, and the grate area was 27.8 sq ft. The boiler carried a working pressure of 225 lb per sq in. Tractive effort at 85 per cent. boiler pressure was 32438 lb. The modified boilers later introduced had a total evaporative heating surface of 1650 sq ft and a grate area of 28.6 sq ft. The tube heating surface was increased to 1479 sq ft. But the important change was from vertical to sloping throatplate; increasing the firebox heating surface from 155 sq ft to 171 sq ft.

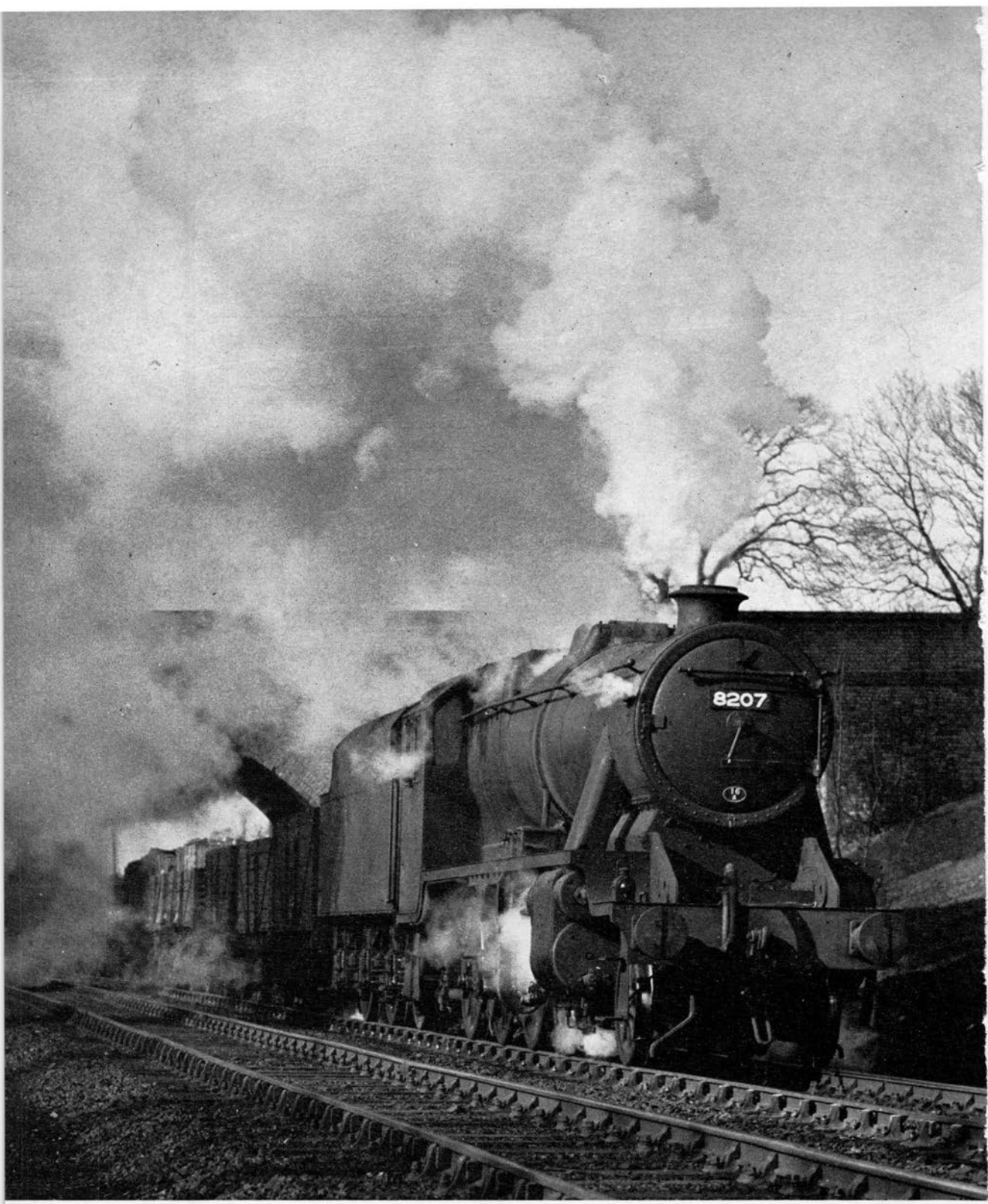
Two outside cylinders, 18½ in by 28 in, and Walschaerts long-travel valve gear were employed. The front Bissel truck had a radius bar 6 ft 7¾ in. long, and wheels of 3 ft 3½ in diameter. The design of the locomotive in general followed the standard practices developed by Stanier, and the tenders were the standard 4000 gallon, 9 ton, capacity design with high curved sides.

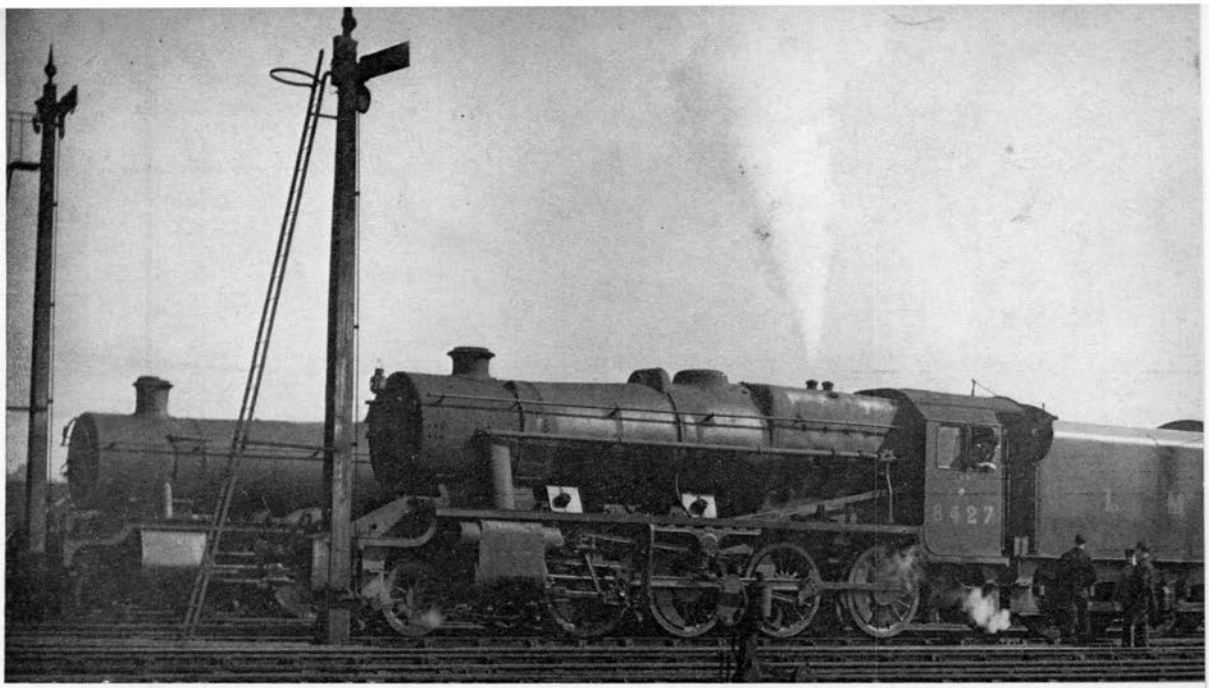
These engines soon proved their worth in everyday service on the LMSR, and it was not surprising that the design should be chosen by the War Department for quantity production to meet the urgent needs of World War 2 transportation; in the same way that the Robinson 2-8-0s of the Great Central Railway had been adopted for WD use in World War 1. As a result of this, the



Above. First of the class, No. 8000, with domeless taper-boiler, seen heading down the Midland main line near Elstree with an empty coal train in pre-war days. [*C. R. L. Coles*

Below. Also hauling empty coal wagons, No. 8399, last of a batch constructed at Horwich in 1945, is seen passing Berkhamsted on December 3, 1946. This characteristic view shows the later boiler, with separate dome and top feed. [*H. C. Casserley*


8207



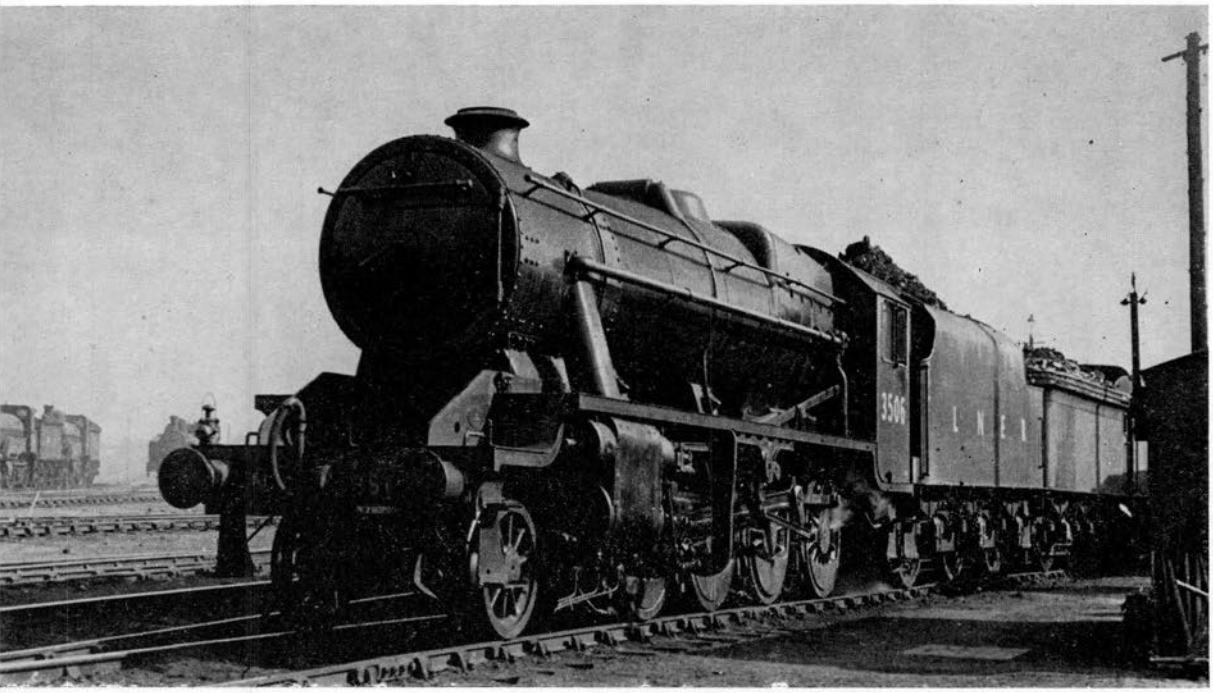
Above. No. 8427, constructed at Swindon in 1944 and on loan to the GWR for over two years. Note the route restriction colour disc painted on the cabside above the number. Photographed at Reading West Junction alongside a GWR Hall class 4-6-0 on September 12, 1944. [*M. W. Earley*

history of the 8Fs is very complex, and the ultimate fate of some locomotives is uncertain. The War Department took over some engines from existing LMSR stock, and placed orders for further new batches. Of these, some were incorporated into LMSR stock, others were pure WD-owned and never carried LMSR running numbers. The total number constructed was 852, of which 133 were pure WD. This makes this the largest Stanier class; although only 666 in fact operated on British soil after the war.

It was at first envisaged that the WD locos would be used on the Continent of Europe, and those batches ordered specially were to have Flaman speed recorders, cab signalling apparatus and Westinghouse air brakes. However, the retreat to Dunkirk put an end to this plan, and in the event, the WD 8Fs went much further afield and saw operation in various parts of the Middle East, including Egypt, Turkey and Iran. Later some went to Italy for a while. Various renumberings took place (and it is also apparent that some exchanged identities into the bargain). Most of those sent overseas by the WD were converted for oil-burning.

Of the locomotives taken over from LMSR stock by the WD, and those specially constructed, many were destined never to return to Britain. Some were destroyed by the enemy; some were lost in transit when the ships carrying them were sunk to the bottom; some became almost complete wrecks through severe usage or neglect. The Egyptian State Railways, the Turkish State Railways and the Iraqi State Railways all took 8Fs into their permanent stock. Some examples are believed to be still running; although it is by no means certain how many. The 8Fs operating in Turkey have the nickname 'Churchills'. It would be impossible in

Opposite. Class 8F 2-8-0 No. 8207 heads a Midland line freight, near Elstree in about 1946. [*E. R. Wethersett*



Above. Before they were handed over to the LMSR in 1946/7, the LNER Stanier 2-8-0s were twice renumbered; becoming LNER Class 06. No. 3506, seen here at Colwick on July 12, 1947, started life as No. 7657, became 3106, then 3506; finally LMSR No. 8710 and BR No. 48710. [*H. C. Casserley*

the space available to list all their various wanderings and re-numberings, but the general details of the class are as follows:

Nos. 8000–8011	Crewe	1935
Nos. 8012–8014	Crewe	1936
Nos. 8015–8026	Crewe	1937
Nos. 8027–8095	Vulcan Foundry	1936/7
Nos. 8096–8097	Crewe	1938
Nos. 8098–8125	Crewe	1939
Nos. 8126–8139	Crewe	1941
Nos. 8140–8157	Crewe	1942
Nos. 8158–8175	Crewe	1943
Nos. 8176–8225	North British	1942

Of the above, 51 were requisitioned by the WD, and only 18 of these were returned in due course. Four were lost in transit.

Nos. 8226–8263 North British 1940

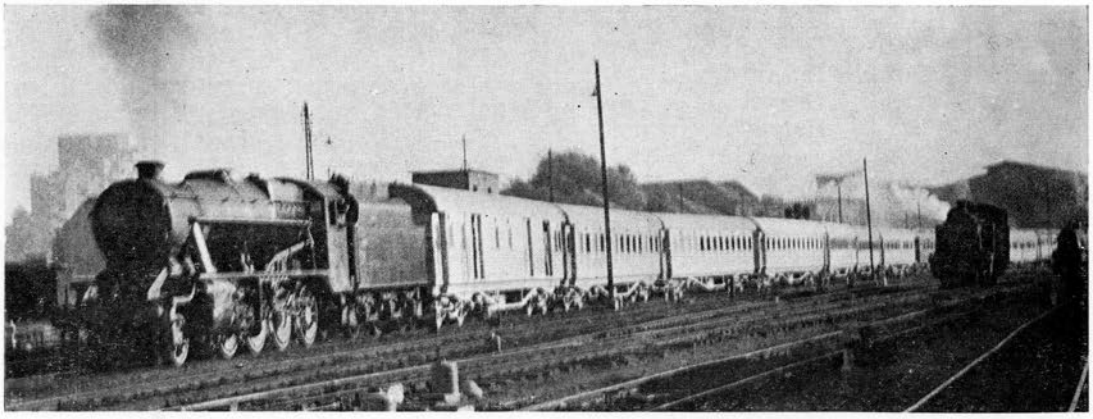
All these were taken over by the WD in 1941 and shipped abroad. Two were lost in transit. [The locomotives that were returned from the WD to BR as Nos. 48246–48263 were not the original locomotives allocated these numbers.]

Nos. 8264–8285 North British 1942

At first allocated to the WD, but placed in LMSR stock in 1943. Two other engines, also built at this time, were shipped to Turkey and never given LMSR numbers.

Nos. 8286–8300 Beyer Peacock 1940

Taken over by the WD in 1941, and shipped abroad. One was lost in transit. No. 8293 was involved in an accident at Slough, whilst on loan to the GWR in 1941, and was not shipped with the rest. It was returned to LMSR stock after repair. [The locomotives returned by the WD to BR as their Nos. 48286–48292 and 48294–48297



Above. Although difficult to reproduce, as it was taken under far from ideal conditions, when film and processing was of indifferent quality, this photograph is of such historic interest that it deserves inclusion. It shows Egyptian State Railways 8F 2-8-0 No. 865 leaving Cairo Main Station at 8.30 pm on June 24, 1945 with the Cairo–Haifa train; the principal service between Egypt and Palestine, which the 8F worked as far as El Quantara East. Two Stanier locomotives, Nos. ESR 850 and 865, were specially overhauled for this duty in April 1945, and had the legend 'The Orient Express' painted in Arabic letters on the cabsides. After a while American-built Mikados displaced the 8Fs on this important working. The photograph was taken with an elderly, battered camera which lived permanently in the pocket of the photographer! *[R. E. Tustin*

Below. In 1947, the LMSR sent one of its staff to the Middle East to examine about 50 Stanier 2-8-0s available for disposal. As a result, 43 were shipped back to England, overhauled at Crewe, and 39 were returned to LMSR stock. The illustration depicts locomotives out of service at Suez. All required general repairs. Note the air brake reservoir and pump clearly visible on the right hand nearest locomotive.
[R. G. Jarvis

are not in all cases the locomotives which originally carried those numbers.]

Nos. 8301–8316	Crewe	1943
Nos. 8317–8330	Crewe	1944
Nos. 8331–8337	Horwich	1943
Nos. 8338–8381	Horwich	1944
Nos. 8382–8399	Horwich	1945
Nos. 8400–8426	Swindon	1943
Nos. 8427–8448	Swindon	1944
Nos. 8449–8479	Swindon	1945

The Swindon built locomotives were on loan to the GWR from new. They were handed over to the LMSR in 1946/7.

Nos. 8480–8489	*Not allocated.*	
Nos. 8490–8495	Horwich	1945

These locomotives introduced the rocking grate and self-cleaning smokebox to the LMSR.

Nos. 8496–8499	*Not allocated.*	
Nos. 8500–8509	Darlington	1944
Nos. 8510–8525	Doncaster	1944
Nos. 8526–8539	Doncaster	1945
Nos. 8540–8542	Darlington	1944
Nos. 8543–8559	Darlington	1945

All the Doncaster and Darlington built locomotives were on loan to the LNER from new, and were handed over to the LMSR in 1946/7.

Nos. 8560–8599	*Not allocated.*	
Nos. 8600–8601	Eastleigh	1942
Nos. 8602–8609	Eastleigh	1943
Nos. 8610–8612	Ashford	1943
Nos. 8613–8617	Brighton	1943
Nos. 8618–8624	Ashford	1943
Nos. 8625–8649	Brighton	1943
Nos. 8650–8660	Eastleigh	1943
Nos. 8661–8662	Eastleigh	1944
Nos. 8663–8670	Brighton	1944
No. 8671	Ashford	1943
Nos. 8672–8674	Ashford	1944
Nos. 8675–8678	Brighton	1944
Nos. 8679–8680	Brighton	1943
Nos. 8681–8704	Brighton	1944

The above locomotives, built in Southern Railway workshops, were intended for service on the LMSR although some ran on the SR when new. In addition to these, the SR built some further 8Fs for the LNER. These had slight modifications and were allocated LNER numbers, as follows:

LNER Nos. 7651–7675 Brighton 1944

These were later renumbered LNER Nos. 3100–3124, and later still became Nos. 3500–3524 (LNER class 06). They were handed over to the LMSR in 1946/7 and became Nos. 8705–8729.

Further 8Fs were built for the LNER, as follows:

LNER Nos. 3125–3147 Darlington 1945/6

These were renumbered LNER Nos. 3525–3547 (class 06) and became LMSR Nos. 8730–8752 when handed over in 1946/7.

LNER Nos. 3148–3167 Doncaster 1945/6

These became LNER Nos. 3548–3567 (class 06) and were returned to the LMSR as their Nos. 8753–8772, in 1946/7.

In addition to the above locomotives, which carried LMSR numbers at some stage in their careers, the following 8Fs were built to WD order:

WD Nos. 338–399	North British	1941
WD Nos. 415–449	Beyer Peacock	1941
WD Nos. 500–524	North British	1941
WD Nos. 540–548	North British	1941/2

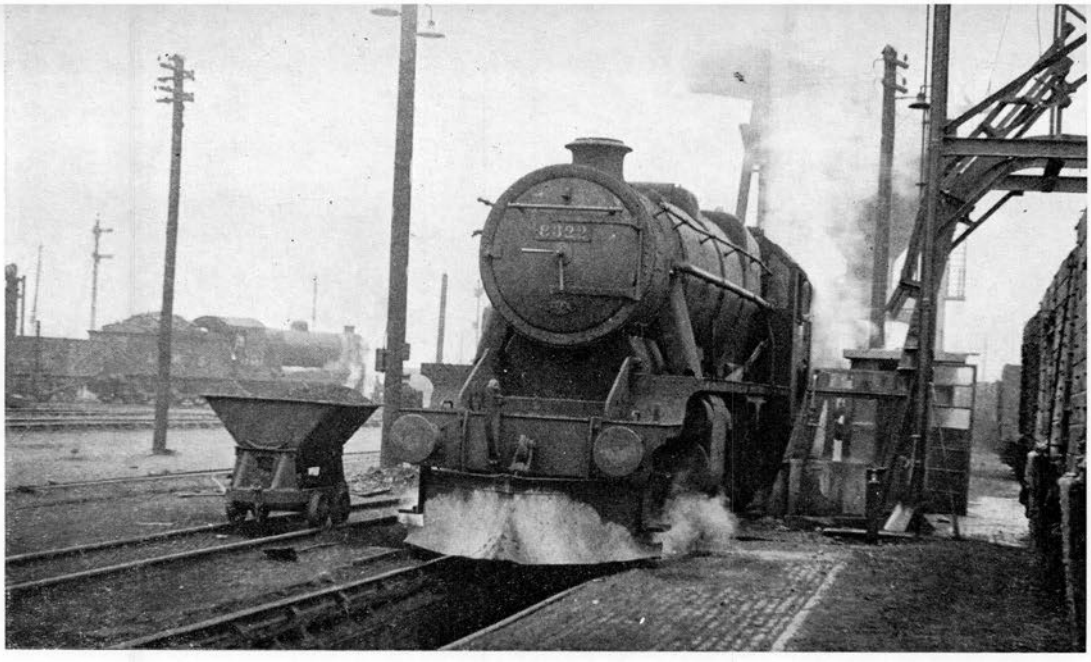
A further three WD locomotives were returned to BR stock in 1957, to become Nos. 48773–48775.

A little known development of the Stanier 8F design was the production of what might be termed 'half' Stanier 2-8-0s for Egypt around 1952. Very satisfied with the 8Fs that they had taken into their own stock, the ESR ordered considerable numbers of additional locomotives built new by Continental and British manufacturers. In these orders, the chassis was identical with that of the Stanier engines, but a different parallel-boiler was applied using flanging blocks standard with other Egyptian classes.

FIRST OF CLASS WITHDRAWN (BR STOCK): 48616 10/60
EXAMPLE PRESERVED: 48773

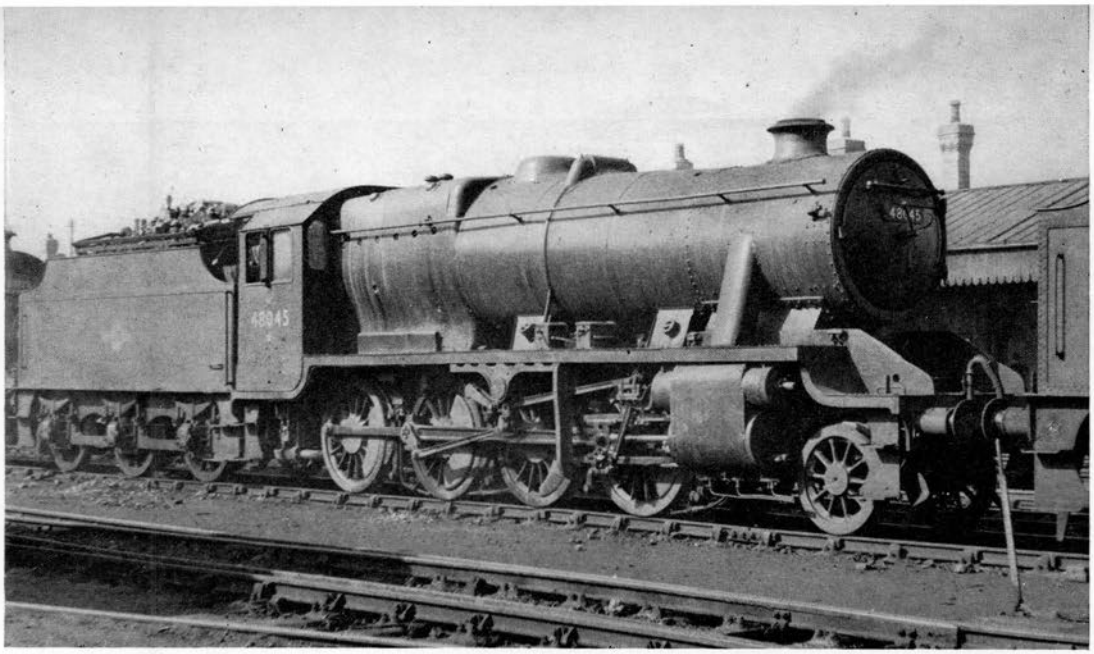
Above. Of the series built for the War Department, a number are believed to be still in service in the Middle East today. Illustrated is Iraqi State Railways oil-burning Stanier 2-8-0 No. 1428, leaving Baiji with a freight for Baghdad, in 1952. [*P. J. Bawcutt*

Below. Iraqi State Railways, ex WD Stanier 8F 2-8-0 oil-burner, on a freight train at Baghdad. The engine has a capuchon added to the chimney and carries a large electric headlight. A four-wheeled auxiliary water tender is attached. [*P. C. Allen*



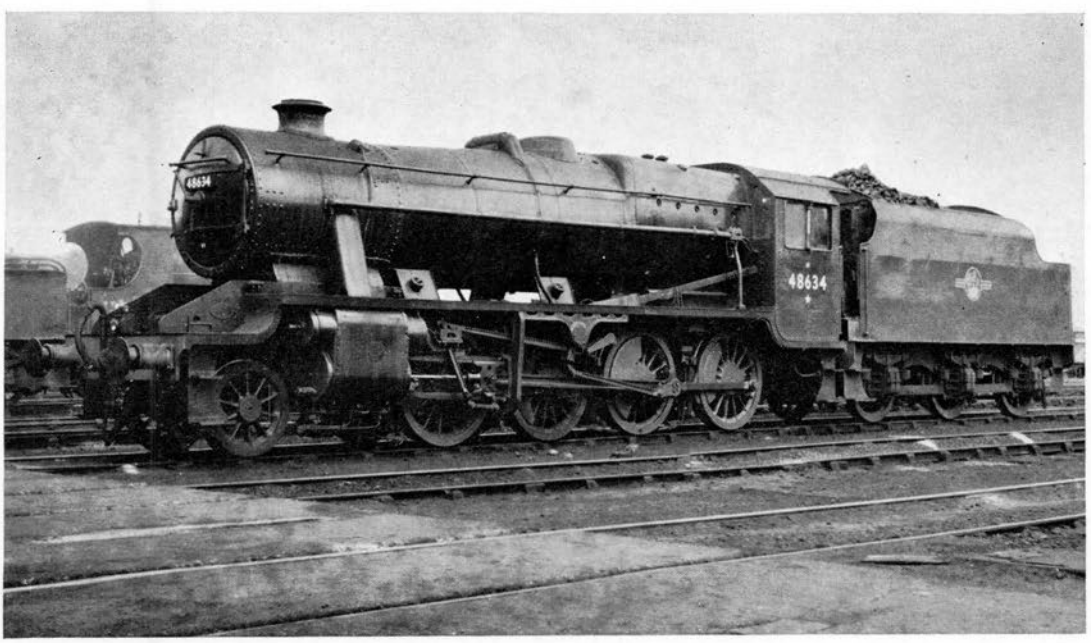
Above. In 1943, 8F No. 8216 arrived at Inverness; the first of the class to operate over the Highland line. The class were then permitted over all Northern Division lines except Stranraer–Ayr–Dumfries and the Kyle line. They operated to Oban. A regular working was from Leeds to Motherwell. During 1944, Perth had an allocation of 17 class 8Fs, and one recorded passenger duty undertaken at this time was a mammoth 15-coach train from Glasgow Buchanan Street to Perth and Inverness, with banking assistance where required. No. 8322 was photographed at Inverness on April 10, 1946, fitted with a small snowplough. [*H. C. Casserley*

Below. SR-built 8F No. 48699 at the head of an up mixed goods and mineral train at Ayres End Lane Bridge, south of Harpenden. The large **X** painted on the cabside below the number denoted that the locomotive was fitted with a manual blowdown valve, and was the subject of a specially supervised water treatment trial. [*E. D. Bruton*

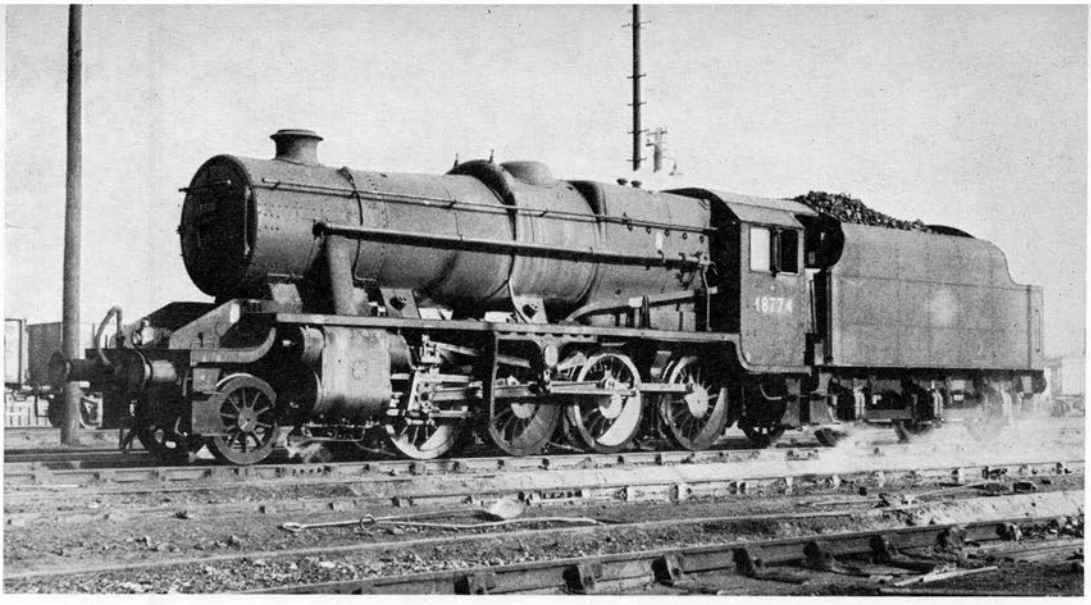


Above. In the late 1950s an exchange of tenders took place between the 8Fs and some Jubilee class 4-6-0s. The Stanier tenders were given to the Jubilees and their Fowler 3500 gallon narrow tenders were paired with the 8Fs. No. 48045 (one of the locomotives returned from the Middle East) was photographed with a Fowler tender, at Northwich, March 15, 1959. [*A. W. Martin*

Below. At about the same time, some 8Fs had 50 per cent. of the reciprocating weights balanced, as they passed through works, in order to fit them for fast freight duties. Locomotives so dealt with had a small star painted below the number, on the cabside. No. 48634 was photographed at Newton Heath in August 1959.
[*J. E. Wilkinson*



Above. In 1956, some Swindon-built 8Fs were transferred back to the Western Region, to replace withdrawn ex-ROD 2-8-0s. They were easily distinguishable by the modified ejector pipe on the left hand side of the boiler. No. 48402 makes a fine picture as it lifts a coal train up the bank to Filton Junction, Bristol, in December 1957; assisted in the rear by a 2-6-2T. [*G. F. Heiron*



Above. Three more 8Fs were returned to BR stock in 1957 after a period of WD service in this country. They became Nos. 48773–48775, and were overhauled at Eastleigh before entering BR service. No. 48774 is shown at Polmadie shed on February 17, 1962. Note the non-standard top feed casing which betrays the WD origin. [*D. C. Smith*

Below. No. 48430 makes hard work of piloting Rebuilt West Country 4-6-2 No. 34046 *Braunton,* on a Southampton–Birmingham football excursion via Oxford, Worcester and Stourbridge. Seen here climbing through Old Hill, Staffs., on April 27, 1963. [*M. Mensing*

Section: 8 2-6-4T Class 4P Passenger Tank Engines

Introduced: 1935 Total: 206

As already mentioned on page 54, the 3-cylinder 2-6-4T design introduced by Stanier for the Southend line in 1934 had not demonstrated any marked advantage over the earlier Fowler 2-cylinder engines when used on similar duties. Stanier was quick to realise the significance of this in terms of cost and weight per locomotive, and the following year saw the introduction of the first of his 2-cylinder version of the taper-boiler 2-6-4T.

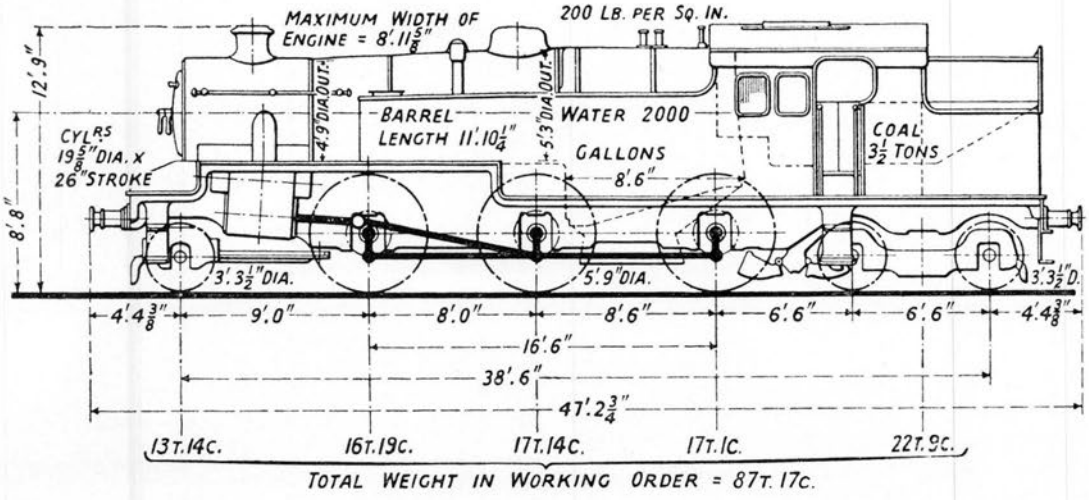
The initial batch of 8 locomotives had low-degree superheat domeless taper-boilers, but all subsequent engines had boilers of improved design, with separate dome and top feed. As first introduced, the domeless boiler had a barrel identical to that provided for the 3-cylinder engines, with a working pressure of 200 lbs per sq in. The total heating surface was 1168 sq ft. Tractive effort at 85 per cent of the working pressure was 24670 lb. The later, improved, boiler had a total evaporative heating surface of 1366 sq ft, comprising a tube heating surface of 1223 sq ft and a firebox heating surface of 143 sq ft. The superheater heating surface was 245 sq ft. The grate area was 26.7 sq ft. Subsequent modifications produced a slightly changed total heating surface of 1369 sq ft.

The coal bunker was arranged to be as self-trimming as possible, and the top was angled inwards towards the rear end in order to improve vision when running bunker first. Water pick-up gear was fitted between the rear coupled wheels and the leading wheels of the trailing bogie, and could be used when the locomotive was running either chimney first or bunker first.

These handsome locomotives were widely distributed over the LMSR system and proved to be excellent performers.

The engines were built as follows:

Nos. 2425–2475 Derby 1936



Nos. 2476–2494	Derby	1937	Nos. 2663–2670	Derby	1942
Nos. 2537–2544	Derby	1935	Nos. 2671–2672	Derby	1943
Nos. 2545–2609	North British	1936			
Nos. 2610–2617	North British	1937	FIRST OF CLASS WITHDRAWN:		
Nos. 2618–2651	Derby	1938	42490 5/60		
Nos. 2652	Derby	1939	LAST OF CLASS WITHDRAWN:		
Nos. 2653	Derby	1940	42616 10/67		
Nos. 2654–2662	Derby	1941	NONE PRESERVED		

Below. One of the initial batch of 8 Derby-built locomotives, with domeless taper-boiler. No. 42544 was photographed leaving the cutting near Shap Summit with the down 5.00 pm Oxenholme–Carlisle stopping train composed of Eastern Region Stock; June 3, 1950. [*E. D. Bruton*

Above. No. 2449, with later, improved, standard taper-boiler with separate dome and top feed. Seen here leaving Bushey with a Euston–Bletchley train.
[*P. Ransome-Wallis*

Below. A chimney curiosity. No. 42487 with BR standard pattern chimney instead of the normal Stanier design. Photographed at Peterborough East; April 29, 1954.
[*H. C. Casserley*

Above. An impressive combination of Stanier steam power. 2-cylinder 2-6-4T No. 42464 assists Princess Royal class Pacific No. 46203 *Princess Margaret Rose*, with the 11.15 am Birmingham–Glasgow express, seen passing Scout Green on January 26, 1957. The 2-6-4T assisted from Oxenholme to Shap Summit.
[*J. E. Wilkinson*

Below. Working bunker first, Class 4P 2-6-4T No. 42613 pilots Jubilee Class 5XP 4-6-0 No. 45717 *Dauntless* on a Liverpool–Windermere train at Oxenholme on August 31, 1963.
[*D. Cross*

Section: 9 2-6-2T Class 3P
Passenger Tank Engines

Introduced: 1935 Total: 139

Basically this was a taper-boiler version of the Fowler 2-6-2T design of 1930, with detail improvements, but retaining the same general dimensions. This small tank engine design is generally considered to have been the least satisfactory of the range of standard types produced by Stanier. Somewhat under-boilered, the class had a reputation as indifferent performers and, although improvements were subsequently made, nothing succeeded in altering this in the eyes of the enginemen.

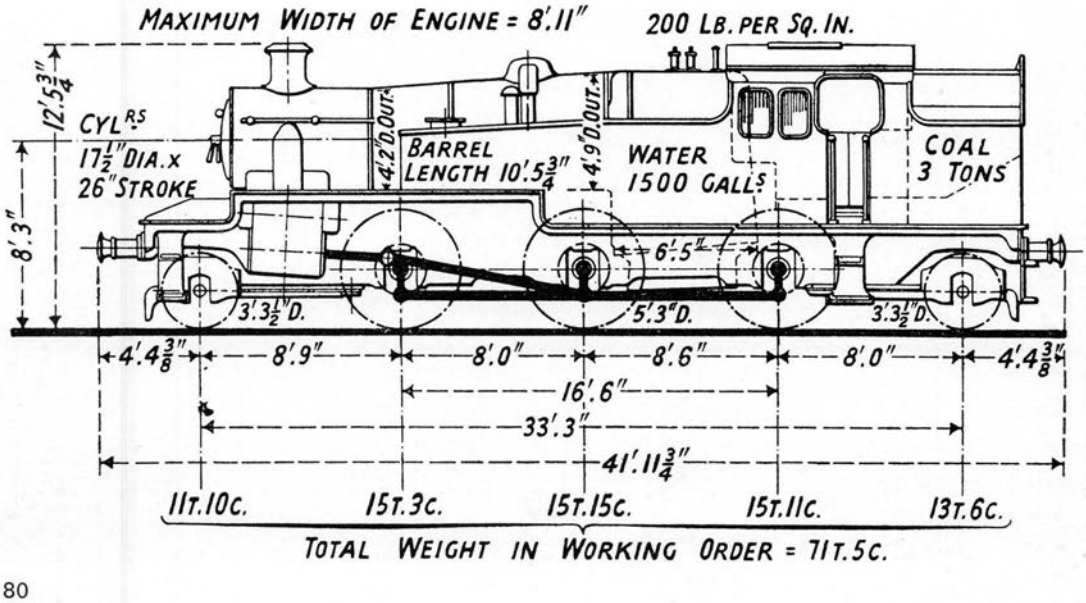
The design in general followed the conventions established during the Stanier regime, with a domeless taper-boiler with top feed, and with an excellent cab design. The coal bunker was carried higher than the rear cab windows, and was angled inwards between them, to provide a good look-out when running bunker first. The bunker was arranged to be as self-trimming as possible.

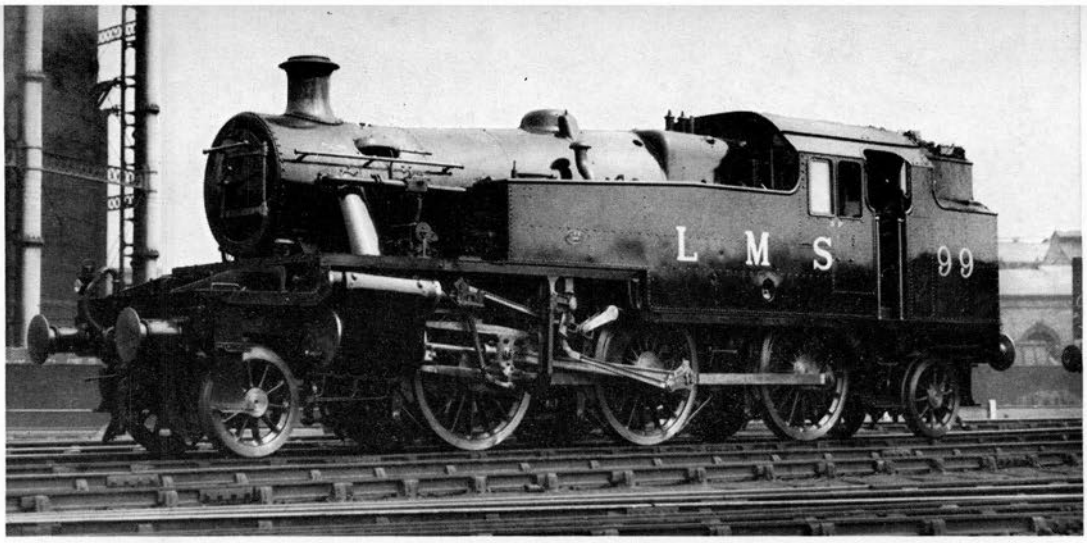
The engines were built as follows:

Nos. 71–144	Derby	1935
Nos. 145–165	Derby	1937
Nos. 166–184	Derby	1938
Nos. 185–190	Crewe	1937
Nos. 191–209	Crewe	1938

Nos. 71–144 were built domeless; the remainder of the class were delivered new with modified boilers, having separate dome and top feed.

They were used on a variety of stopping train, branch line, empty stock and banking duties, and examples of the class were allocated to most parts of the LMSR system





Above. One of the 1935 Derby-built batch, in original condition with domeless taper-boiler. This had low degree superheat with a surface of 72.8 sq ft. The total evaporative heating surface was 878.4 sq ft, of which the tubes provided 774.5 sq ft and the firebox 103.9 sq ft. The grate area was 17.5 sq ft. The working pressure was 200 lb per sq in and the tractive effort at 85 per cent of the working pressure was 21486 lb. Two outside cylinders were provided, with 17½ in diameter by 26 in stroke, and Walschaerts long-travel valve gear. When new the class was finished in black livery with red lining. No. 99 is depicted in ex-works condition, at St. Pancras. [*P. Ransome–Wallis*

Below. The second series was constructed in 1937/8 at both Derby and Crewe. The main difference was the improved boiler design, with separate top feed and steam dome. As finally running, locomotives with this boiler had a total heating surface of 1046 sq ft, of which the superheater provided 74 sq ft, the firebox 107 sq ft and the tubes 939 sq ft. Grate area was increased to 19.2 sq ft. Trials held in attempts to improve the draughting resulted in the adoption, as standard, of a modernised version of the Adams 'Vortex' blastpipe, with larger diameter chimney. No. 40149 is shown with all these features, working a St. Pancras surburban duty past Elstree. [*F. R. Hebron*

Above. The larger diameter chimney used in conjunction with the 'Vortex' blast-pipe is very apparent in this view of No. 40072, at Blackpool. The engine retains the original domeless taper-boiler. *[A. Swain*

at various times in their career.

In a final attempt to improve upon their indifferent performance, more drastic re-building was contemplated soon after the beginning of World War 2. when a larger boiler was tried out. This did not prove to be worth the money, and only five engines of the class carried the larger boilers; Nos. 148/163/167/169/203.

FIRST OF CLASS WITHDRAWN:
(SMALL BOILER)—11/59
(LARGE BOILER)—40163 11/59
LAST OF CLASS WITHDRAWN:
(SMALL BOILER)—40196 12/62
(LARGE BOILER)—40148 9/62
NONE PRESERVED

Below. The larger boiler, tried out soon after the beginning of World War 2. This had a total heating surface of 1106 sq ft, with a 14 element superheater providing 145 sq ft. The tubes provided 995 sq ft and the firebox 111 sq ft. Grate area was increased to 19.2 sq ft. All this was achieved with an increase in locomotive weight of only $1\frac{1}{4}$ tons. No. 40167, on empty stock at St. Pancras. *[A. Swain*

Above. Class 3P 2-6-2T No. 40101 pilots Ivatt class 2 2-6-0 No. 46443 on the 3.10 pm Chinley–Sheffield, at Chinley North Junction on September 7, 1957. [*E. Oldham*

Below. In spotless lined-black livery, No. 40071, photographed at Stockport Edgeley on June 1, 1957 [*T. Lewis*

Section: 10 4-6-0 Class 6P
Express Passenger Engine

Introduced: 1935 Total: 1
Royal Scot

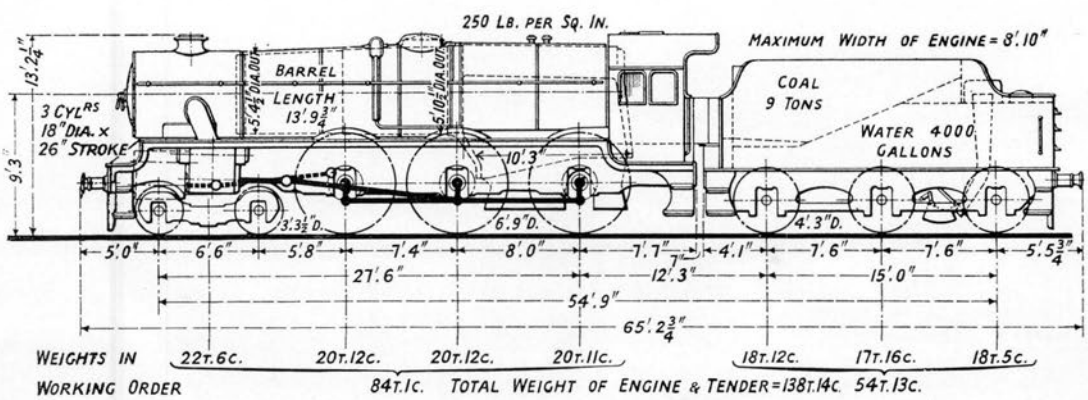
Although listed as one of the Royal Scot class, No. 6170 *British Legion* was in certain important respects a unique locomotive.

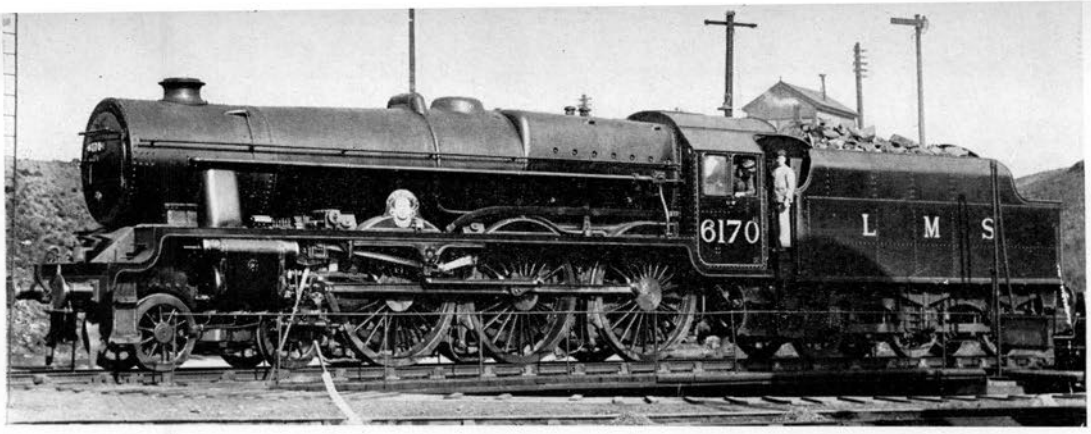
Following a tragic failure whilst still on trial in Scotland, the Fowler experimental high pressure 4-6-0 No. 6399 *Fury*, had been withdrawn from service in 1930. For some years the damaged engine was stored in the paint shop at Derby, and it was the decision to rebuild it as a conventional 4-6-0, utilising certain parts such as the frames and wheels of the original, that resulted in the appearance of No. 6170 in 1935.

It would perhaps be more accurate to describe *British Legion* as Stanier's *equivalent* to the original Royal Scot design, rather than as a conversion. In fact it incorporated the standard features of Stanier's practice, and in addition it demonstrated many improvements upon the earlier Stanier 4-6-0s, particularly in the design of the taper-boiler. This had a separate dome and top feed, and a working pressure of 250 lb per sq in. As first built, the boiler had a total heating surface of 1864 sq ft, comprising tube heating surface of 1669 sq ft; firebox heating surface of 195 sq ft; superheater heating surface of 360 sq ft, and grate area of 31.25 sq ft. Tractive effort at 85 per cent boiler pressure was 33150 lb. The boiler was modified during the course of the engine's life and a BR diagram shows it to, have ended its career with a total heating surface of 1988 sq ft. There were various alterations to the superheater.

The main point which made this engine unique was the boiler, with a distance between tubeplates of 14 ft 3 in compared to 13 ft 0 in. for the Converted Royal Scot class. There was no spare boiler, and visits to works for heavy repair tended to be rather lengthy, as a result.

In common with the Fowler engines a 3-cylinder layout was used, with Walsch-





Above. As first built, No. 6170 *British Legion* had a single blastpipe and chimney. The taper-boiler had the top feed immediately ahead of the dome. An early modification was made to the outside steam pipes, which were at first raked back (see line drawing on page 84). No. 6170 was the only taper-boilered Royal Scot to receive LMSR crimson lake livery, and the only engine of the class to have a Stanier side-window cab. The tender was of standard 4000 gallon Stanier high sided design, with 9 tons coal capacity. [*E. Treacy*

aerts long-travel valve gear, but the cylinders were modified to provide a saddle for the smokebox. When new there was a cross-head vacuum pump located on the left-hand side.

In pre-war days No. 6170 was allocated to Longsight, later it was transferred to Camden, and in its final years to Crewe North.

The locomotive was constructed at Crewe.

WITHDRAWN: 12/62

Below. Steaming at first proved erratic, and a Kylchap double blastpipe and chimney were later fitted, and modifications made to the cylinders, with satisfactory results. No. 46170 is seen here in postwar LMSR black livery, but with BR number and lettering. Photographed climbing Camden Bank with the 4.5 pm express to Holyhead; May 22, 1949. [*C. C. B. Herbert*

Above. In final state, with smoke deflectors added, No. 46170 is seen in ex-works condition, at Crewe; in BR green livery. During the course of its life the boiler was modified somewhat, and as finally running it had a total heating surface of 1988 sq ft, comprising tube heating surface of 1793 sq ft, firebox, 195 sq ft, and superheater, 367 sq ft. The grate area was 31.25 sq ft. [*J. R. Carter*

Section: 11 4-6-2 Class 7P
Express Passenger Engines
Introduced: 1937 Total: 38
Coronation

By the mid 1930s the competition from road and air, and from the rival LNER services, made some speeding-up of the principal express trains highly desirable. Plans were therefore put in hand for a new high-speed Anglo-Scottish train, to be introduced in Coronation year 1937; also for a general increase in the number of trains running to 'XL' schedules.

Although the Princess Royals were performing well on the Anglo-Scottish run it was realised that an improved Pacific design was needed, with a built-in capacity for sustained high-speed steaming. The importance of internally streamlined steam passages had been recognised by André Chapelon, and Stanier took full advantage of this advance in locomotive engineering when scheming-out his new Pacific. Particular attention was paid to the front end layout, and careful tests were made to ensure the freest possible passage of steam into and out of the cylinders.

All vestiges of Stanier's early bias towards low-degree superheat had been swept aside by the time the Coronation Pacifics were on the drawing-board, and with a 40-element superheater of 830 sq ft, the new design had the largest superheating surface of any British locomotive. Compared to the Princess Royals, there were other important changes in the design. The boiler was vastly improved, with splendid steam-raising capacity, and the total evaporative heating surface was increased from 2516 to 2807 sq ft. The driving wheel diameter was increased from 6 ft 6 in to 6 ft 9 in, and to prevent any significant loss of tractive effort as a result of the larger wheel diameter, the diameter of the cylinders was increased by $\frac{1}{4}$ in. The outside cylinders were brought forward and all trace of the GWR King class cylinder disposition, as used on the Princess Royals, disappeared. Only two sets of outside valve motion were used, with the inside valves worked by rocking-shafts from the outside valve spindle cross-heads, (the inverse of Swindon practice, where the outside cylinder valves were operated by rocking-shafts from the inside cylinder valve motion set between the frames).

As first built the locomotives had a tube-heating surface of 2577 sq ft, a fire-box heating surface of 230 sq ft, making a total evaporative heating surface of 2807 sq ft. The superheater heating surface was 830 sq ft (some sources state this to have originally been 856 sq ft), and the grate area was no less than 50 sq ft. Working pressure was 250 lb per sq in and the tractive effort at 85 per cent boiler pressure was 40000 lb.

The new LNER streamliners had caught popular imagination, and thus it was hardly surprising that when the new series of Pacifics was planned for the LMSR it was agreed that the first of these should be finished in streamlined form. This decision to enclose the locomotive in an aero-dynamical shroud resulted in approximately two extra tons of metal; the engine weight in working order being 108.1 tons. Over the years considerable debate has centred around the relative merits of streamlined versus conventional locomotive forms for engines intended to operate at high speeds, and a general conclusion is that the reduction in wind resistance only offsets the added weight when a really long continuous high-speed run is possible. Such conditions were hard to find in Britain in pre-war

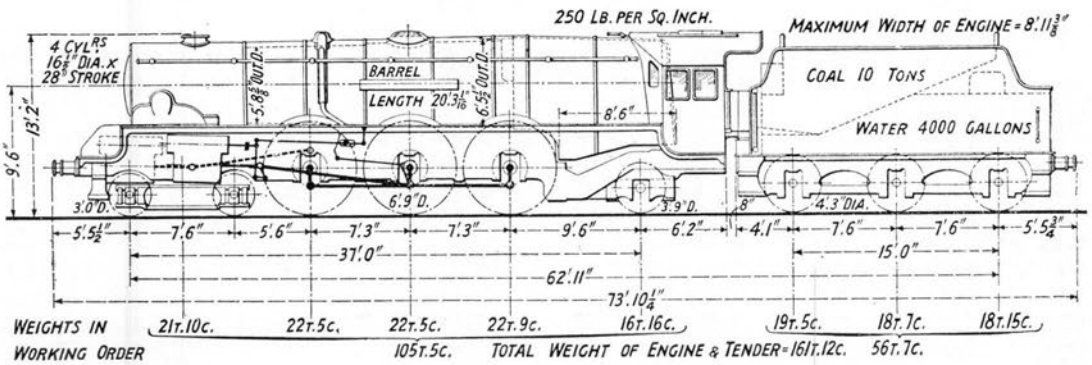
days (consider the vast expenditure on civil engineering which preceded the introduction of today's 100 mph electric service from Euston), and it is significant that removal of the streamlined casings from the Coronation Pacifics at a later stage in their career, did not apparently affect their everyday performance in the slightest. But in the 1930s the public craze was for streamlining, and from a publicity point of view, the Directors of the LMSR were undoubtedly wise in bowing to this. Certainly the shape evolved at Derby was an eye-catching one, with a rich blue livery offset by four bold silver cheat lines, which commenced in a chevron at the front of the locomotive and were carried horizontally along the sides. For the special high-speed train introduced in 1937, the 'Coronation Scot', the livery was continued down the entire length of the train. The visual effect of this, and the publicity gained from a maximum speed of 114 mph, achieved by No. 6220 *Coronation*, on a special test run, did much to restore prestige to the LMSR Anglo-Scottish service and took some of the limelight off the rival LNER streamliners.

Five locomotives were delivered in this form, and soon demonstrated that the design was an outstanding success. No modifications were necessary; the engines steamed and rode magnificently right from the start. Without doubt the Coronation Pacific, last new design by Stanier for the LMSR, was his masterpiece.

More of the class were required for the principal London–Scotland and London–Merseyside services, to operate 'XL' schedules, and the next batch were also streamlined, but the livery was changed to maroon and gilt. The probable reason for this was the closer match it made to normal LMSR maroon carriages, when the locomotives were used on services other than the 'Coronation Scot' (which it was intended should also be repainted in maroon and gilt in due course).

Presumably the passion for streamlining had cooled off by 1938, for the next batch to appear were not streamlined—and very handsome they proved to be! The change was only superficial, no working parts were affected, but the weight was reduced to 106.4 tons. However, further streamlined locomotives appeared next, and it was not until the changed conditions of wartime operation and maintenance made such frivolities appear decidedly out of place, that further non-streamlined Pacifics were built.

Principal allocations of the class were always to Camden, Crewe, Carlisle, Polmadie and Edge Hill, and their main spheres of activity were the Euston–Glasgow, Euston–Liverpool and Crewe–Perth runs. They were also to be found on the Perth–Aberdeen, Carlisle–Glasgow St. Enoch runs, and at Edinburgh Princes Street; sometimes they were to be seen on the North Wales coast. They were the obvious choice for Royal Train duties over the West Coast route and were always beautifully groomed for this honour; although in pre-war days there was something faintly ludicrous about the spectacle of a streamlined blue and silver Pacific at the head of the majestic



Above. First of the class, No. 6220 *Coronation*, in blue and silver livery, photographed at Camden shed. When new, Nos. 6220–6234 had a single blastpipe and chimney. The design was subjected to wind tunnel tests to ensure an efficient aerodynamical shape before drawings were finalised [*C. R. L. Coles*

clerestory carriages finished in LNWR plum and spilt milk livery.

The tender design was based upon the high-capacity 4000 gallon version finally fitted to the Princess Royals, with a coal capacity of 10 tons. These had proved slightly troublesome on the through Anglo-Scottish workings, as the coal farthest from the footplate was difficult to fetch forward by hand. For the Coronation Pacifics, Stanier introduced a steam-operated mechanical coal pusher, which greatly eased the fireman's task. The tenders for the streamlined engines had extended side sheets and the frames and bearing springs were partially concealed by a valance.

The engines were built as follows:

Nos. 6220–6224 Crewe 1937
Streamlined. Blue and silver livery.

Nos. 6225–6229 Crewe 1938
Streamlined. Maroon and gilt livery.

Nos. 6230–6234 Crewe 1938
Non-streamlined. Maroon and gilt livery.

Nos. 6235–6239 Crewe 1939
Nos. 6240–6244 Crewe 1940
Streamlined. Maroon and gilt livery.

Nos. 6245–6248 Crewe 1943
Streamlined. Wartime black livery.

Nos. 6249–6252 Crewe 1944
Non-streamlined. Wartime black livery.

Nos. 6253–6255 Crewe 1946
Non-streamlined. Postwar LMSR black livery.

No. 6256 Crewe 1947
No. 46257 Crewe 1948
Non-streamlined. Postwar LMSR black livery (46257 was lettered 'British Railways'). Modified design by H. G. Ivatt.

The liveries denoted above are those carried by the various batches when new.

FIRST OF CLASS WITHDRAWN:
46227/31/2 12/62
EXAMPLES PRESERVED:
46229/33/5

W700

Above. No. 6221 *Queen Elizabeth* makes a splendid picture as it heads the 'Coronation Scot' train in windy conditions. Note the blue and silver livery carried along the sides of the carriages. [*E. R. Wethersett*

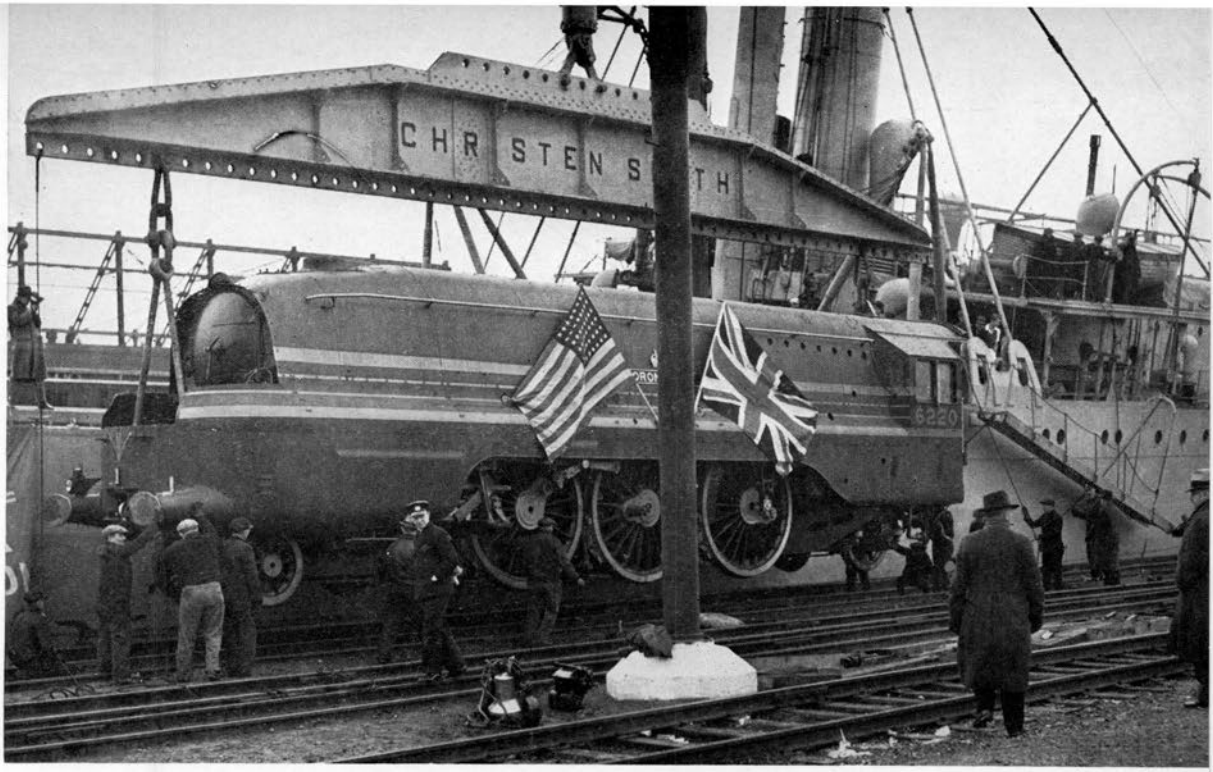
Opposite. No. 6220 *Coronation* streaks through the countryside near Watford with the inaugural 'Coronation Scot' train. This view emphasises the streamlined form adopted for the new Pacifics. [*Modern Transport*

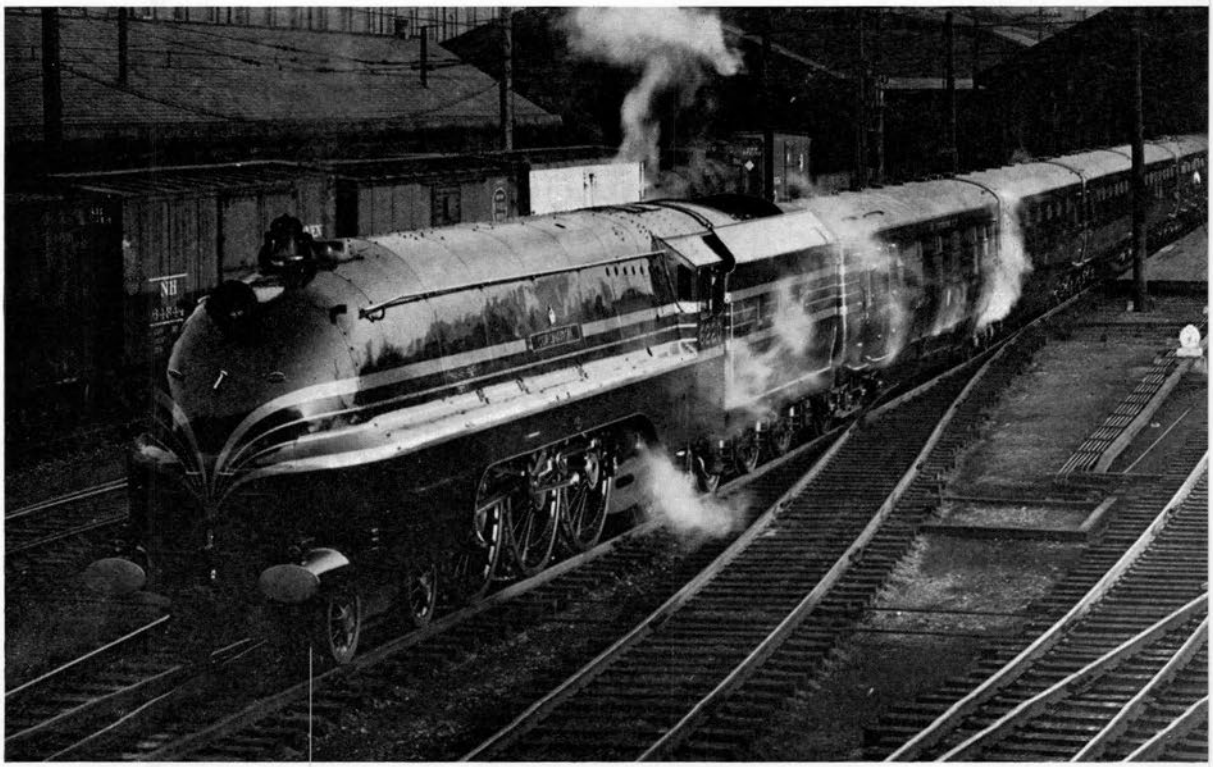
Above. With Nos. 6230–6234 a superficial change took place, in that they were constructed without the streamlined outer casing. Many enthusiasts regarded these truly massive engines as the most handsome of Stanier's Pacifics. Illustrated in immaculate condition is No. 6232 *Duchess of Montrose,* as originally built. In 1939, No. 6234 of this non-streamlined batch was fitted with an experimental double blastpipe and chimney, and it was as a result of tests with this locomotive that all the Coronation Pacifics were subsequently given double chimneys. [*E. Treacy*

Opposite page:

Top. For the 1939 New York World's Fair, the LMSR shipped a Coronation Pacific and part of a new set of carriages intended for the 1940 'Coronation Scot' service. No. 6229 *Duchess of Hamilton,* completed at Crewe in September 1938, exchanged identities with the original No. 6220 *Coronation,* specially for this event. Seen here as No. 6220, but in the maroon and gilt livery of the second streamlined series, from No. 6225 onwards, the locomotive is being unloaded at Baltimore, after shipment from Southampton. [*Modern Transport*

Bottom. No. 6229, alias 6220 *Coronation* made an extensive tour over American Railroads, from March 21 to April 14, 1939 (covering 3121 miles), prior to going on show at New York. To conform with American law, the engine was equipped with bell and large electric headlight. The train is seen here on Baltimore and Ohio metals at the commencement of the tour. The train was still in America when World War 2 broke out, and it was not until 1943 that it was considered safe to ship the locomotive back to Britain; the carriages remained in America until the war was over. *Coronation* was unloaded at Cardiff, and once back on LMSR metals it resumed its former identity as No. 6229, and the real No. 6220 once again became the first of the class. [*Modern Transport*


CHR STEN S TH
6220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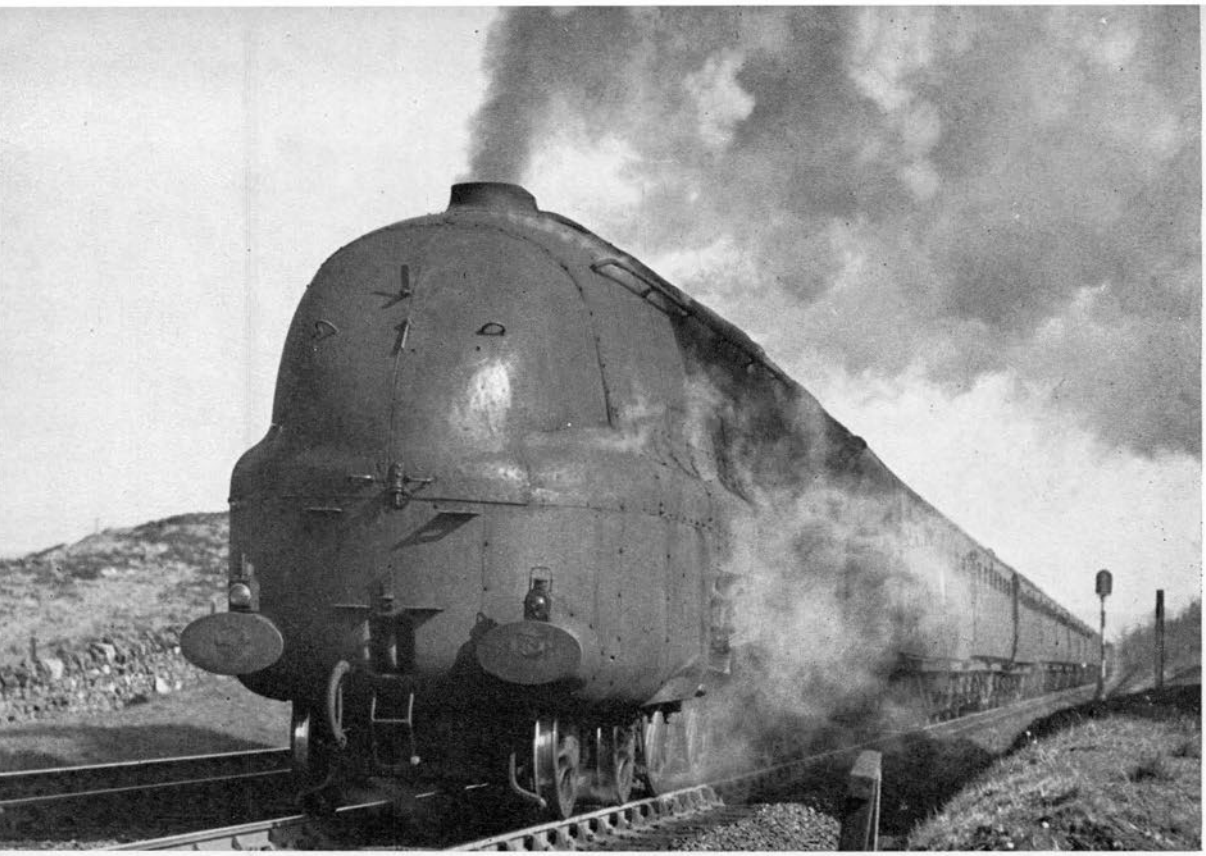


This page:

Above. Further streamlined engines were constructed in 1939/40/3, despite the outbreak of World War 2. But by 1943 it was proving difficult to justify the added cost and weight involved. In addition, the lack of cleaners meant that all publicity value was gone; whilst the hard-pressed maintenance staff were justifiably critical of the added complications of servicing these machines, with many parts not readily accessible without time-wasting removal of portions of the streamlined casing. The final streamliners were painted plain black when new, and earlier ones were repainted black as they passed through works. Illustrated is No. 6221 *Queen Elizabeth*, showing all too clearly the effects of wartime conditions as, with glands blowing badly, she climbs Shap with the 10.0 am Euston–Glasgow express. [*E. Treacy*

Opposite page:

Top. This rear ¾ view of No. 6231 *Duchess of Atholl* emphasises the impressive appearance of the original non-streamlined Pacifics. Note the speedometer driven off the rear coupled driving wheels. The maroon livery applied to Nos. 6230–6234 when new was of special high-quality finish, with gilt lining edged with vermilion. [*P. Ransome-Wallis*

Bottom. Nos. 6249–6252, built in 1944, reverted to the non-streamlined form of Nos. 6230–6234. Their tenders were however, streamlined, which suggests that this batch was originally envisaged as streamliners. No. 6252 *City of Leicester* is shown as first delivered, in wartime black livery. Commencing with No. 6235 all the new Pacifics were built with double chimneys (on No. 6245 this was an experimental Kylchap version), and the earlier engines were similarly modified. [*BR*

DUCHESS OF ATHOLL
6231

6252
CITY OF LEICESTER
6252
L M S

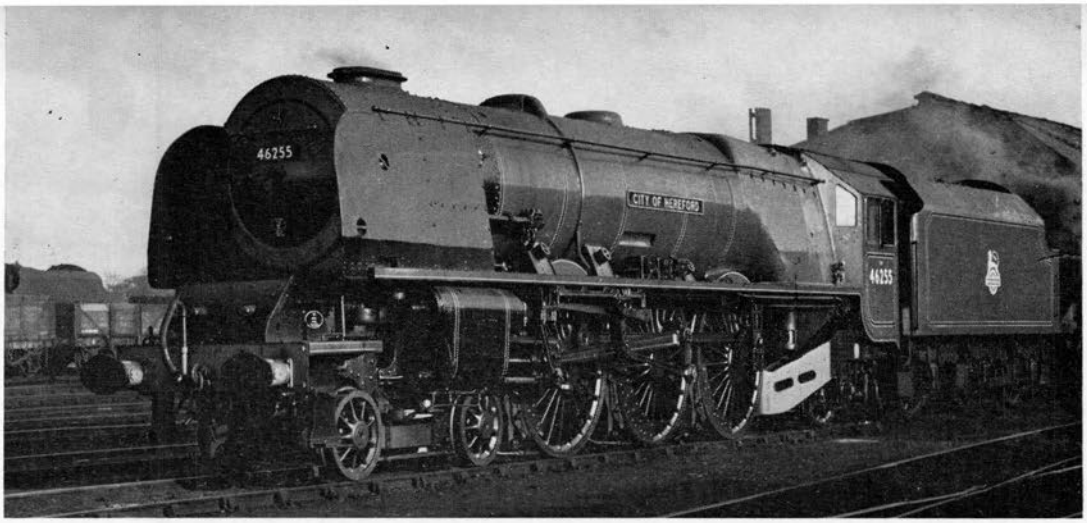
Above. As already mentioned, wartime conditions had drawn attention to the maintenance problems created by the streamlined casings, and in order to permit more ready access for maintenance, it was decided to remove the casings from all the locomotives concerned. This involved a certain amount of reconstruction, particularly at the front end. A most striking feature of the de-streamlined Pacifics was the tapered top to the smokebox. These smokeboxes had been tailored to suit the streamlined form, and they were retained until they became life expired. The first Pacific to be de-streamlined was No. 6235 *City of Birmingham,* in 1946. Seen here in BR green livery, but otherwise unaltered, this view clearly shows the front end modifications, with cutaway footplating, and the tapered smokebox top. Smoke-deflectors were added to all the Coronation Pacifics after the war. The tenders also had the streamlining removed. [*BR*

Below. It was a de-streamlined Coronation Pacific that was chosen to represent the class in the 1948 Locomotive Exchanges. No. 46236 *City of Bradford* is seen here at Waterloo, coupled to an 8-wheel Austerity tender (necessary because of the absence of water troughs on the SR), about to depart with a down West of England express. In the background is N15X Remembrance class 4-6-0 No. 32332 *Stroudley.* [*BR*

Above. One of the original non-streamlined batch, No. 46230 *Duchess of Buccleuch* as running in BR days, with double chimney and smoke-deflectors added. Photographed at Carlisle, waiting to take the down 'Royal Scot' forward to Glasgow. [*E. Treacy*

Next page:
This unusual view of No. 46238 *City of Carlisle,* photographed in Crewe North shed yard on June 25, 1964, emphasises the massive proportions of these handsome engines. It also clearly shows the cutaway footplating at the front end, and the double chimney. The tapered smokebox has been replaced by a new one of normal shape.
[*J. R. Carter*

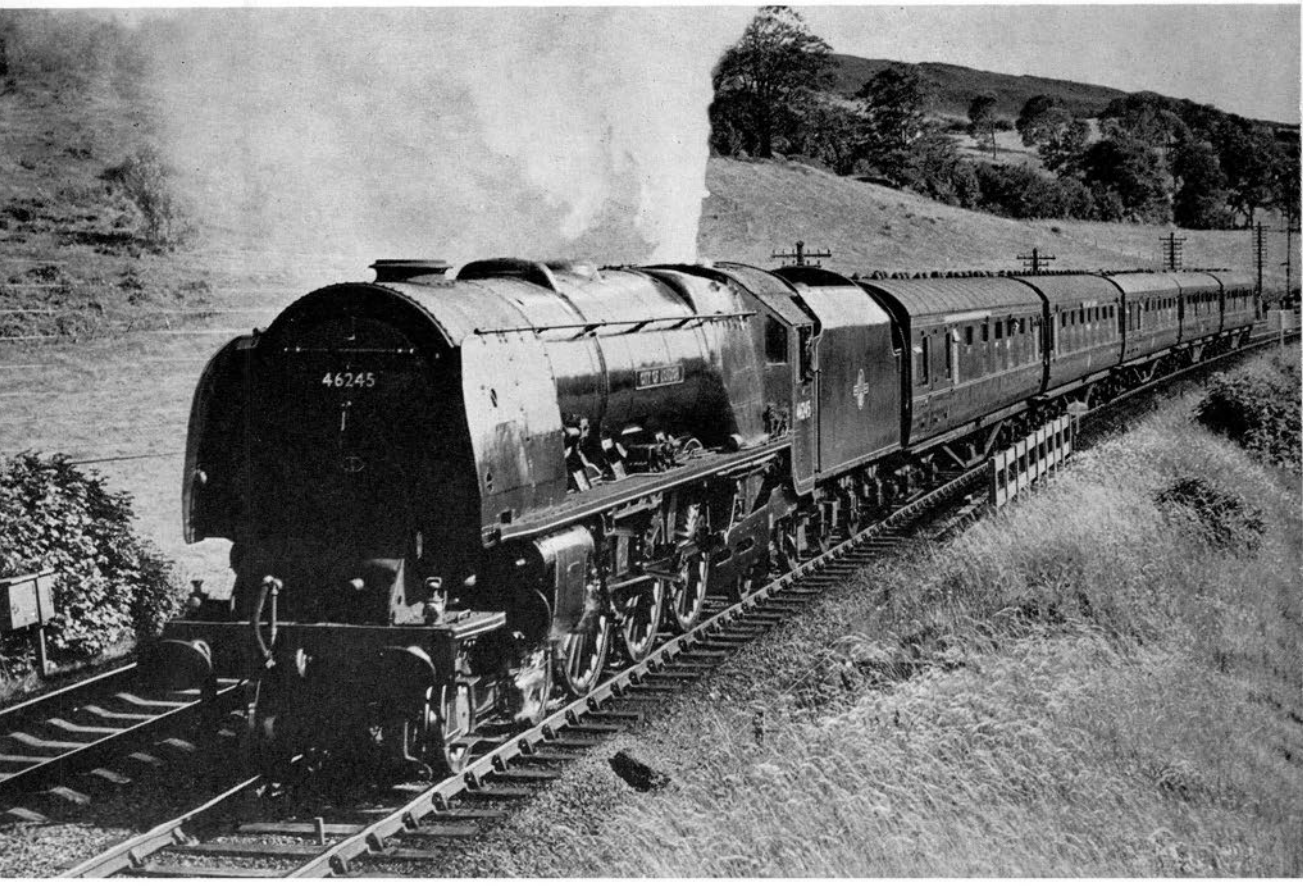
46238



Above. After the 1944 non-streamlined batch no further new Pacifics were constructed until 1946, when Nos. 6253–6255 were delivered from Crewe. These were non-streamlined engines and had smoke-deflectors right from the start. The front end footplating was cut away in similar fashion to the de-streamlined engines. No. 46255 *City of Hereford*, in BR blue livery, was photographed at Crewe North shed on September 4, 1950. [*E. Treacy*

Below. In 1955/6 comparative trials took place between the Coronation Pacific design and the WR King class 4-6-0s, as modified by BR with larger superheater and double chimney. The Coronations were represented by No. 46237 *City of Bristol*, which ran on the 'Cornish Riviera' express with dynamometer car attached. The engine also ran over the Paddington–Birmingham route, and it is seen here at the top of Hatton Bank, with the 9.10 am Paddington–Wolverhampton express; on April 25, 1955. [*R. J. Blenkinsop*

1Z10
46238


46245

Above. No. 46240 *City of Coventry* puts up a splendid exhaust as it hauls the 8.0 am Newquay–Manchester through train. [*C. P. Walker*

Opposite page:

Top. Another shot of No. 46238 *City of Carlisle*, taken as she headed a Carlisle United football supporters excursion through Penrith on the occasion of the FA cup tie between Carlisle and Preston on February 15, 1964. The engine is in spotless crimson lake. In 1958 it was decided to repaint 20 Pacifics, based on the London Midland Region (16 Coronations and 4 Princess Royals), in crimson. Scottish Region examples remained in green. [*P. J. Robinson*

Bottom. Also in spotless crimson lake, No. 46245 *City of London* makes a superb sight as she heads the down 'Lakes Express' out of Oxenholme, on July 13, 1963. [*E. Oldham*

Above. The two final Coronation Pacifics, built in 1947/8, were to a modified design by H. G. Ivatt. Timken roller bearings were fitted to all axles on engine and tender, and the trailing truck was of one-piece cast steel construction. They had the new standard postwar features introduced by Ivatt; the rocking grate, self-emptying ashpan and self-cleaning smokebox, (these features were also on Nos. 6253–6255 built in 1946). In this final form they represented the finest heavy express passenger power ever produced for a British railway. By a happy inspiration it was decided to name No. 6256 *Sir William A. Stanier, F.R.S.* As BR No. 46256 and in early livery of lined-black, the locomotive is seen leaving Preston with a Perth–London express. Electric lighting was fitted to the engine when new, and the steam generator can be seen immediately behind the right hand smoke-deflector. White headcode discs were carried in daytime. [*E. Treacy*

Opposite page:

Top. Temporary withdrawal of the WR King class 4-6-0s in 1956, for rectification of bogie troubles, resulted in the loan of some LMR Pacifics to Old Oak Common (see also page 24). No. 46257 *City of Salford,* last of the class constructed, was one of the engines which ran on the Western. She is seen here ascending Dainton Bank with the down 'Cornish Riviera' express, on February 8, 1956. [*D. S. Fish*

Bottom. A rear ¾ view of No. 46256 *Sir William A. Stanier, F.R.S.* taken inside Crewe North shed on September 23, 1964. This clearly shows the modified rear end of the last two Coronation Pacifics, with the reduced depth of the cab side sheets; cast steel trailing truck and modified frames. The diagonal yellow stripe on the cabside was applied to the 19 members of the class still in service on September 1, 1964 when they were prohibited south of Crewe due to height restrictions under overhead electric catenary. A last minute hope that some Coronations could be transferred to the Waterloo–Bournemouth main-line of the SR was abandoned because of restricted clearances in the Southampton area. All remaining examples of this fine class were withdrawn from service in September 1964, the last to be in steam was very appropriately No. 46256. [*J. R. Carter*

130

46256

Section: 12 4-6-0 Class 6P
Express Passenger Engines

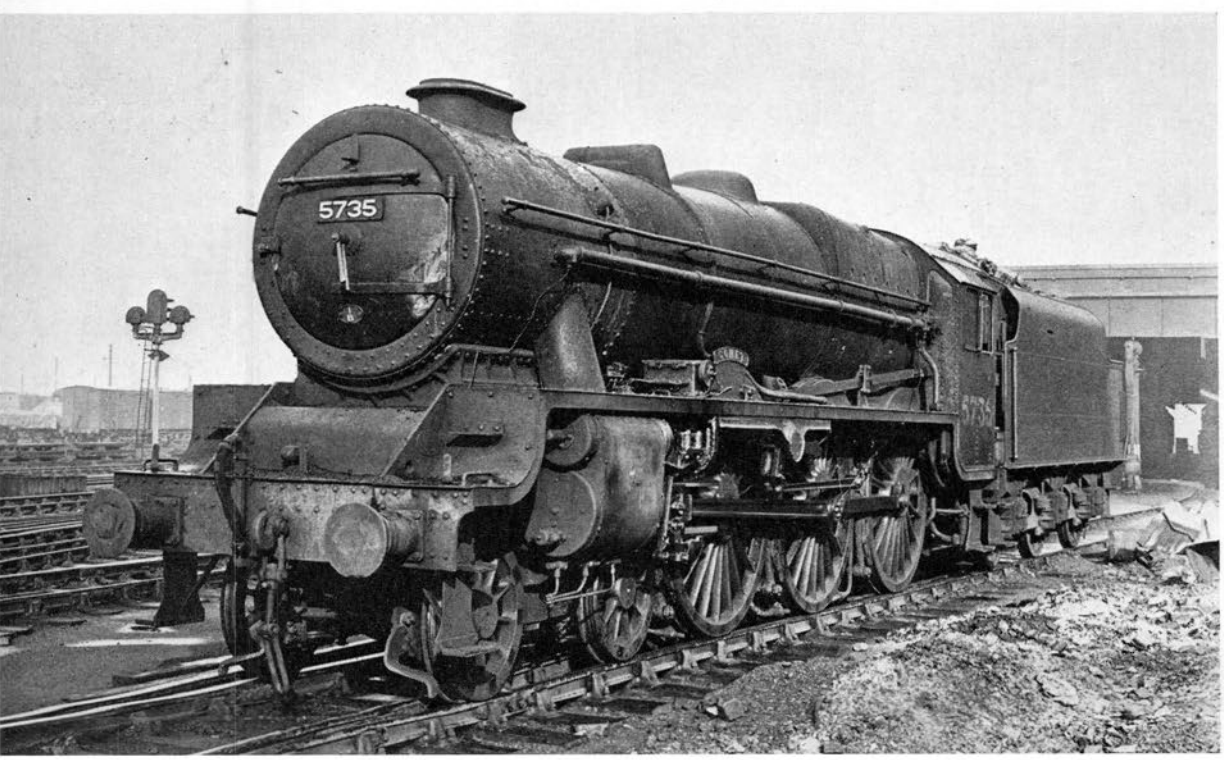
Introduced: 1942 Total: 2
Rebuilt Jubilee

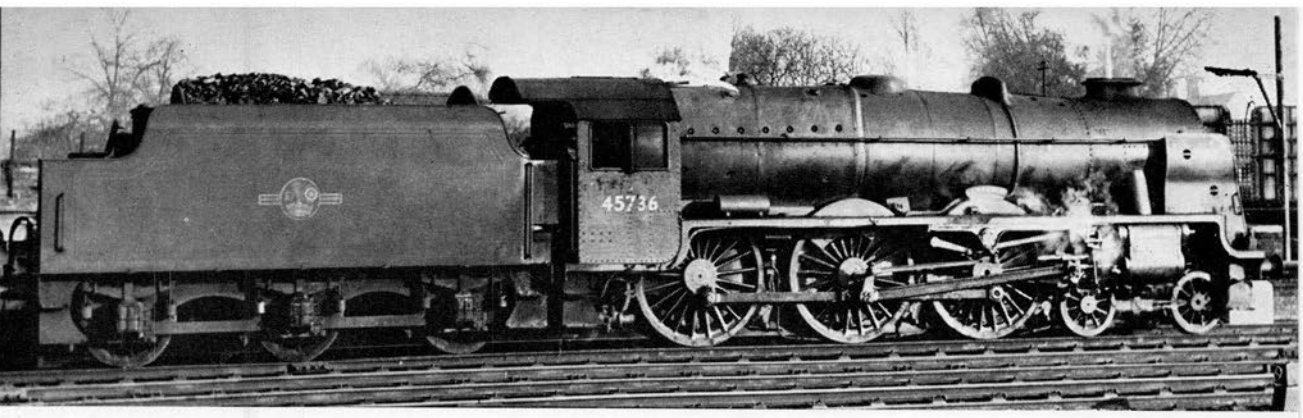
The hit-and-miss modifications made during attempts to improve the performance of the 5XP Jubilee class 4-6-0s have already been mentioned. In 1937 it was proposed to rebuild some of the class with two outside cylinders only, but with a bigger boiler. The easement of weight restrictions on certain routes, however, permitted the retention of a 3-cylinder arrangement by the time it was decided to fit larger boilers to the class, in 1942. Even so the engine weight in working order was only increased by $2\frac{1}{2}$ tons.

In early 1943 two engines were therefore given entirely new type 2A boilers and a new exhaust arrangement. This was accompanied by an announcement that the LMSR intended to extend this modification to the rest of the class. However, for reasons detailed below, the scheme never materialised and Nos. 5735 *Comet* and 5736 *Phoenix*, were destined to remain the sole examples. In 1943 they were reclassified from 5XP to 6P, thereby making them the equivalent in power to the Royal Scot class.

The principal chassis alterations were a rear extension of the frames and a new smokebox saddle. A double blastpipe and chimney were provided, and the top feed

Below. No. 5735 *Comet,* in wartime plain black livery. Photographed at Camden. [*P. Ransome-Wallis*





Above. In BR days the two Rebuilt Jubilees received curved smoke deflectors similar to those of the Converted Royal Scots and Rebuilt Patriots. No. 45736 *Phoenix* was photographed at Stafford in November 1959. [*J. B. Bucknall*

clacks were moved forward on to the first ring of the boiler barrel.

The new 2A boiler was identical to that later used on the Converted Royal Scot class (see page 107) and had tubes 13 ft long with a tube heating surface of 1667 sq ft, a firebox heating surface of 195 sq ft, a total evaporative surface of 1862 sq ft, a grate area of 31.2 sq ft, and a superheating surface of 357 sq ft.

Later modifications to the boiler resulted in a total evaporative surface of 1851 sq ft, comprising a tube heating surface of 1656 sq ft, and a firebox heating surface of 195 sq ft. The superheating surface was increased to 367 sq ft.

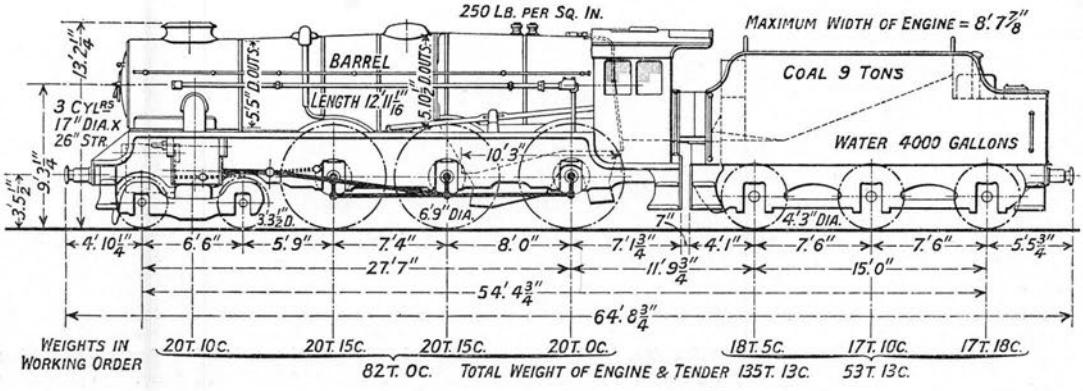
Three principal reasons why no further Rebuilt Jubilee's appeared were as follows:

(**a**) The decision to rebuild the Royal Scot class was taken soon after the appearance of Nos. 5735/6, and because of leaky smokebox problems on the Fowler Scots it was preferred to press ahead with rebuilding this class, as cost permitted.

(**b**) The original 5XP Jubilees were themselves being progressively improved by higher superheat, retubing to give better proportions and by improvements in draughting. This was much cheaper than rebuilding.

(**c**) Despite a brilliant early career the Patriot class 4-6-0s were no longer the equal of the recently improved 5XP Jubilees. When the operating department required more class 6P power it was therefore the Patriots that were chosen for rebuilding with new 2A boilers, not the Jubilees.

FIRST OF CLASS WITHDRAWN:
45736 9/64
LAST OF CLASS WITHDRAWN:
45735 10/64
NONE PRESERVED



Above. Another view of No. 45736, taken at Newton Heath shed in September 1959, showing the standard BR AWS equipment. [*J. E. Wilkinson*

Opposite. No. 6131 *The Royal Warwickshire Regiment* heads a down Manchester express near Tring. The locomotive is in postwar LMSR black livery. [*E. Treacy*

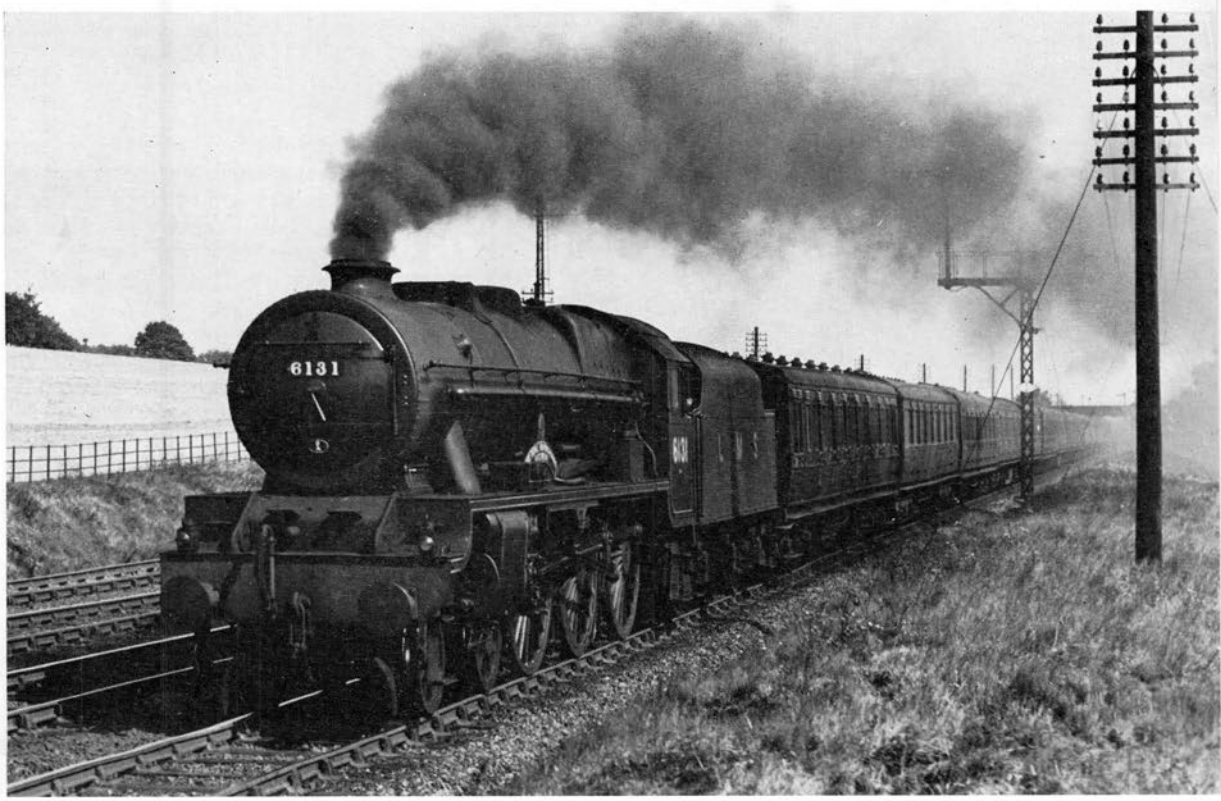
Section: 13 4-6-0 Class 6P
Express Passenger Engines

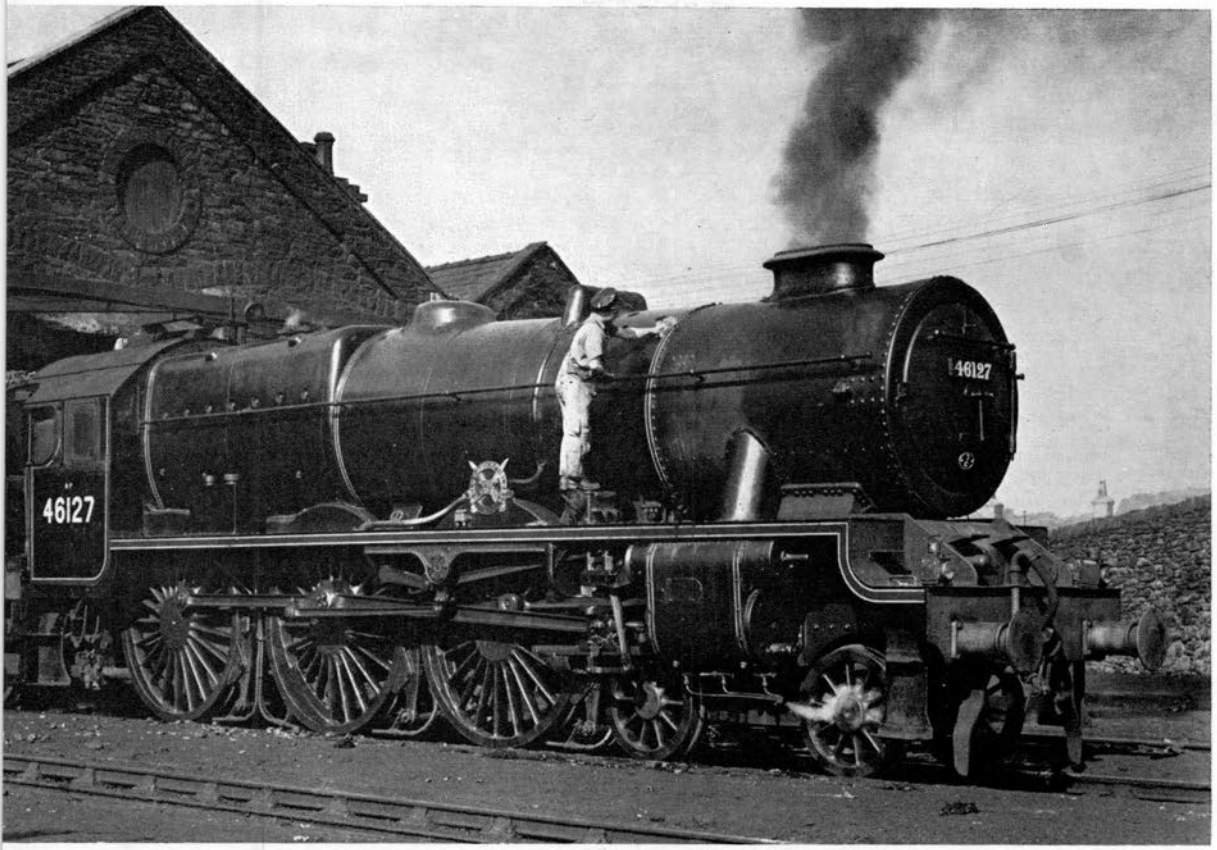
Introduced: 1943 Total: 70
Converted Royal Scot

Known officially as the Converted Royal Scot class, these engines were in effect almost complete rebuilds of the original Fowler design. Only the cab, the wheels and frames, the tenders (of Stanier design in any case), and certain smaller features were retained from the Fowler engines. In fact their unofficial name of 'Rebuilt Scots' was a closer description ! The original wheelbase dimensions were retained, but the maximum axle load was reduced by nearly half a ton, and the total locomotive weight was reduced by almost two tons.

Details of the type 2A boiler dimensions are given in the section on the Rebuilt Jubilees (page 104), but it is of interest to note that, compared to the unrebuilt parallel-boiler Fowler Royal Scots, the rebuilt version had over 200 sq ft less evaporative heating surface. The tube proportions were, however, more favourable for good steaming. The firebox heating surface was 6 sq ft greater; the grate area remained the same at 31.2 sq ft; the superheating surface was reduced by 42 sq ft. The working pressure remained at 250 lb per sq in. Tractive effort at 85 per cent boiler pressure was 33150 lbs.

Authority was given in 1943 for 20 Royal Scot conversions to be undertaken at Crewe. By this time many engines had been in service for 10 years or more and were becoming due for new boilers and cylinders; there was also trouble from leaky





Above. This shot of No. 46127 *Old Contemptibles*, receiving the attention of a cleaner at Holyhead shed, also shows the postwar LMSR black livery with maroon and straw lining; a livery which seemed particularly suited to these engines.
[*E. Treacy*

smokeboxes. The worst of these were chosen as the first candidates for conversion, and the first to appear was No. 6103 *Royal Scots Fusilier*. Some engines had general repairs after 1943, without rebuilding, and it was not until 1955 that the last of the 70 locomotives in the class was rebuilt. This was No. 46137 *The Prince of Wales Volunteers* (*South Lancashire*).

It is no exaggeration to claim that the Converted Royal Scots were an outstandingly successful class of locomotives in relation to their size. They put up some sparkling performances in everyday service and they gained an excellent reputation for steaming. One weakness was a tendency for rough riding to set in; this could be aptly described as wild, but safe!

Externally they had a pleasingly neat appearance, although this was later spoiled somewhat by the addition of smoke-deflectors. Apart from these, and alterations in livery, their appearance was virtually unchanged throughout their distinguished careers.

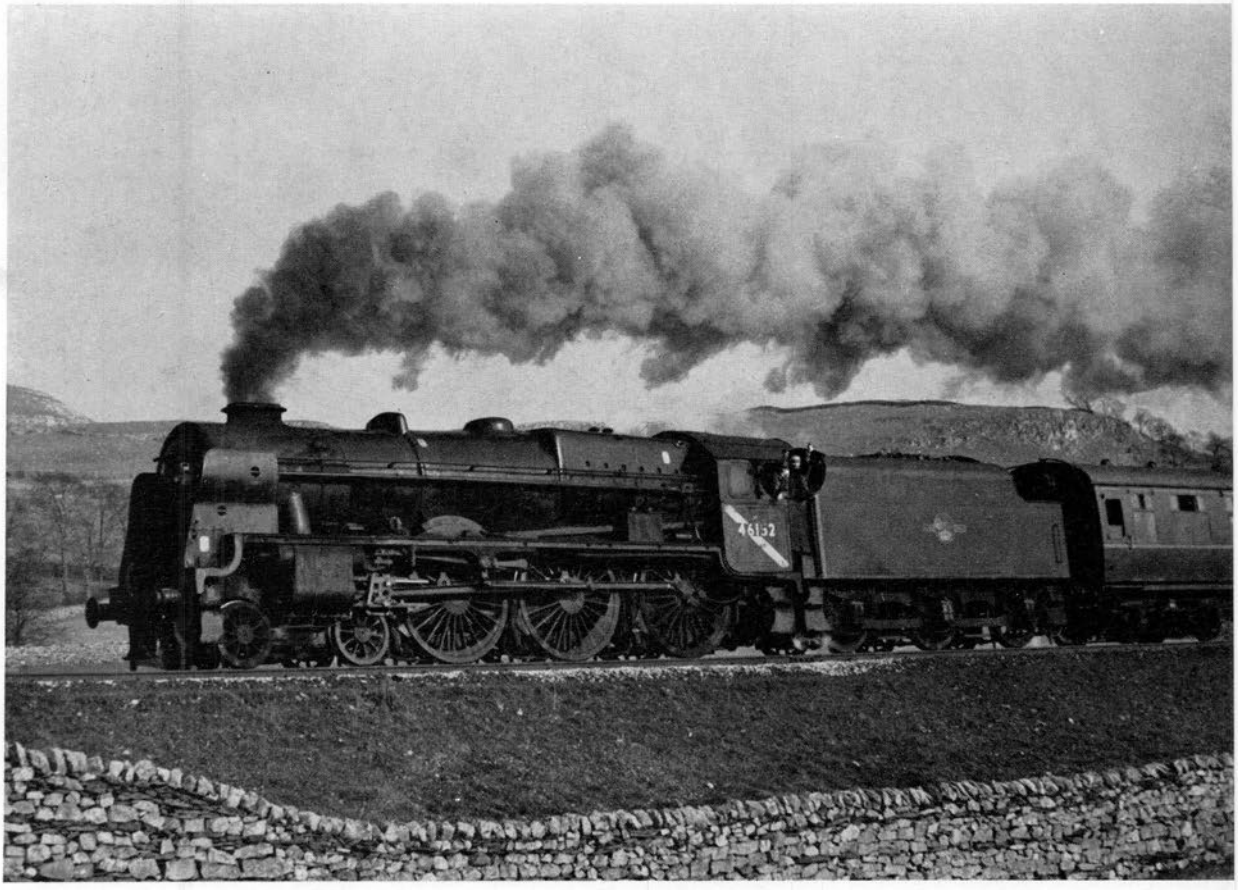
The main allocation of the class was always to the North Western main line, but the first few rebuilt were allocated to Leeds for through workings to Glasgow. In their later days (circa 1957 onwards) they appeared on the Midland main line, and they also operated into Marylebone over the Great Central route.

FIRST OF CLASS WITHDRAWN:
46139 10/62
EXAMPLES PRESERVED: 46100/15

Above. The two Converted Royal Scots which featured in the 1948 Locomotive Exchanges were responsible for some impressive performances. To provide adequate water supply when operating on the Southern Region West of England main line, where no water troughs existed, No. 46154 *The Hussar* was temporarily paired with an 8-wheel Austerity tender. She is seen passing Vauxhall with the 10.50 am express to Plymouth on June 7, 1948. [*E. S. B. Elcombe*

Below. A classic photograph of No. 46162 *Queen's Westminster Rifleman,* the other Converted Scot which featured in the 1948 Exchanges. Taken in Sonning Cutting, at the head of the up 8.30 am Plymouth–Paddington express on May 18, 1948. [*M. W. Earley*

46105



Opposite page:

Top. Problems of drifting exhaust obscuring the driver's vision led to the adoption of small curved smoke-deflectors for the class. First to be fitted was No. 6115 in August 1947. This illustration shows No. 46105 *Cameron Highlander,* in clean BR green livery, at Tebay on the 4.20 pm (Sundays only) Carlisle–Preston train; May 15, 1955. [*J. E. Wilkinson*

Bottom. Odd-man-out of the class was No. 46106 *Gordon Highlander,* which received straight-sided smoke-deflectors somewhat similar to those employed on BR standard locomotives. No. 46106 is seen here (minus nameplates) working the southbound 4.45 pm Fish train from Perth; leaving Perth in June 1962.
[*W. J. V. Anderson*

This page:

Above. Commencing in 1962 the Converted Scots were selected for scrapping as and when their condition warranted it. Those still in stock on September 1, 1964 were henceforth prohibited from working south of Crewe, due to height restrictions for locomotives working under the energised 25 kv catenary. A broad yellow diagonal stripe was painted on the cabsides to denote this restriction. No. 46152 *The King's Dragoon Guardsman* is shown hauling the 3.40 pm Bradford–Carlisle train out of Settle, on April 3, 1965. It was withdrawn from service the very same month.
[*P. F. Claxton*

Section: 14 4-6-0 Class 6P
Express Passenger Engines

Introduced: 1946 Total: 18
Rebuilt Patriot

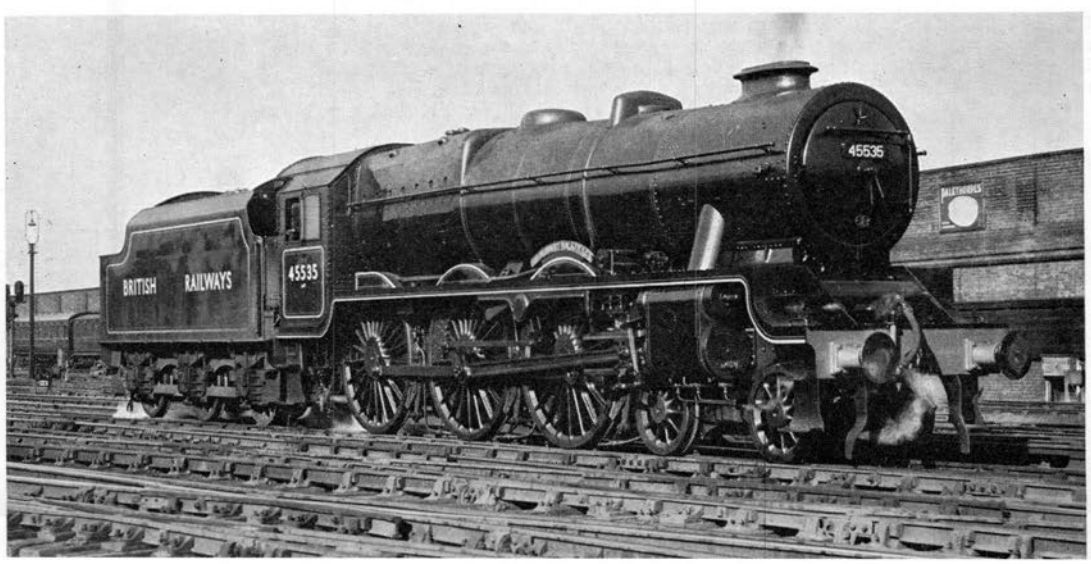
Although not introduced until some two years after Stanier had ceased to have any direct personal influence upon LMSR locomotive affairs. the Rebuilt Patriots were entirely Stanier inspired. Fitted with the same superb Crewe 2A boiler that was applied to the Converted Royal Scots and the Rebuilt Jubilees, the Rebuilt Patriots were thus considered as equal 6P express passenger power. As rebuilt, their dimensions corresponded almost exactly with the two Rebuilt Jubilees (see page 104), and with a reduced cylinder diameter of 17 in they had the identical tractive effort of 29590 lb, compared with the 33150 lb of the Converted Royal Scots.

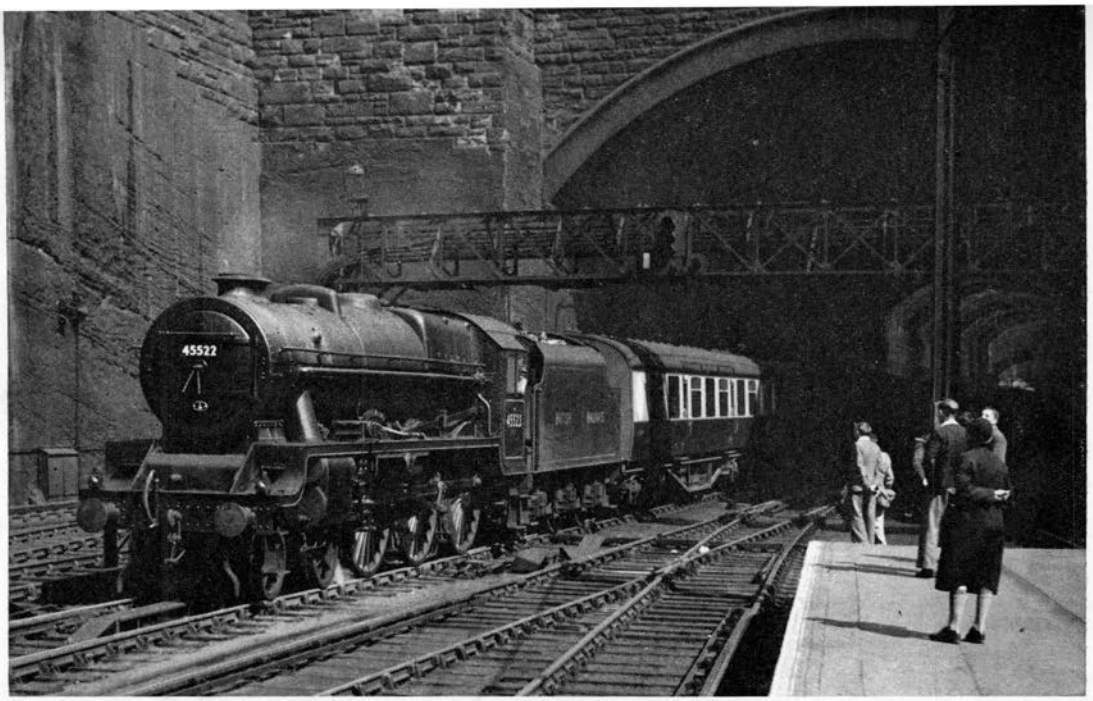
Of the total class of 52 Patriots, only 18 were rebuilt and none of the first 12 of the class were included, as they had certain non-standard features. The rebuilding involved a new Stanier cab and tender as well as a new boiler. The tender was of standard 4000 gallon, 9 ton capacity high curved side design.

Despite their lower tractive effort, the Rebuilt Patriots took their place alongside the Converted Scots in everyday service, and their performance was most satisfactory.

FIRST OF CLASS WITHDRAWN:
45514 5/61
LAST OF CLASS WITHDRAWN:
45530 1/66
NONE PRESERVED

Below. The Rebuilt Patriots displayed the same handsome outline as the Converted Royal Scots, except that a Stanier cab replaced the original Fowler version. No. 45535 *Sir Herbert Walker, K.C.B.* was photographed whilst painted in the experimental LNWR style lined black livery of early BR days. The top feed casing was of modified design, with more rounded appearance, introduced by Ivatt. [*E. Treacy*





Above. Also in lined black livery, No. 45522 *Prestatyn* is seen entering Liverpool Lime Street with a Whit Monday express, in 1951. [*K. Field*

Below. A fascinating comparison of the front ends of a Converted Royal Scot and a Rebuilt Patriot, showing the subtle differences in appearance which existed. Rebuilt Patriot No. 45532 *Illustrious* was photographed alongside Converted Royal Scot No. 46143 *The South Staffordshire Regiment*, on the arrival side at Euston. [*P. Ransome-Wallis*

Above. Another shot of No. 45532 *Illustrious,* this time on a more humble duty. She is seen climbing past Clifton, with the morning pick-up freight from Carlisle to Harrison's Sidings, Shap; May, 1963. The Rebuilt Patriots were fitted with curved smoke-deflectors of similar design to those applied to the Converted Royal Scots; from 1948 onwards. [*P. J. Robinson*

Section: 15 2-6-4T Class 4P Passenger Tank Engines

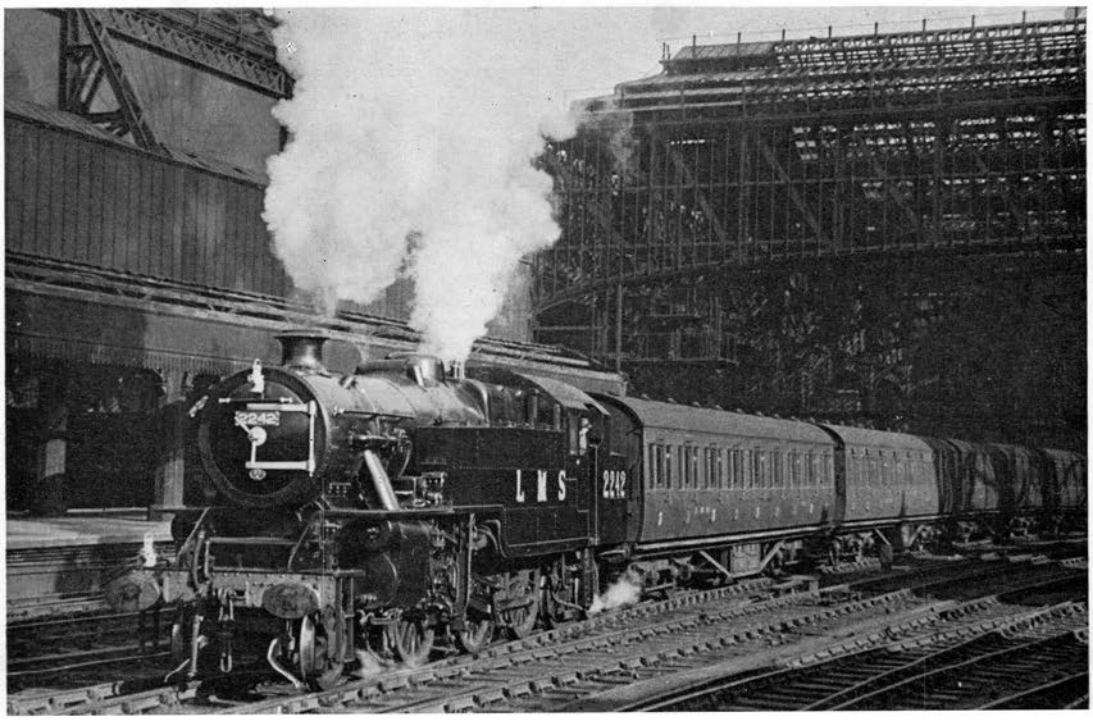
Introduced: 1945 Total: 277

The usefulness of the reliable Stanier 2-cylinder 2-6-4T design of 1935 (see page 76), was further extended when C. E. Fairburn introduced a modified version in 1945. The principal modification was a reduction of the coupled wheelbase from 16 ft 6 in to 15 ft 4 in, thereby enabling the engines to be used on 5-chain curves instead of the 6-chain limit of the original version. Coupled with a reduction of the overall weight in working order from 87.85 tons to 85.25 tons, this modification allowed an extension of their spheres of activity. Externally they differed but little from the earlier engines except at the front end, where the footplating was of shallow section and was cut away ahead of the cylinders; lighter section footplate steps were used.

The taper-boiler had a tube heating surface of 1226 sq ft, a firebox heating surface of 143 sq ft, a superheater heating surface of 230 sq ft, and a grate area of 26.7 sq ft. The working pressure was 200 lb per sq in and the tractive effort at 85 per cent boiler pressure was 24670 lb. The engines had self-cleaning smokeboxes, rocking grates and self-emptying ashpans.

The Fairburn version was widely distributed over the LMSR system and duties

Below. Scottish enginemen in charge of the Fairburn 2-6-4Ts working on Glasgow suburban and Clyde Coast trains, kept their locomotives in immaculate condition. No. 2242, with smokebox embellishments and with its plain black livery gleaming, was photographed on a Cathcart Circle suburban train leaving Glasgow Central on April 24, 1948. [*H. C. Casserley*



Above. When new, Nos. 42198/9 ran trials on the Southern Region, to assess the suitability of the design for adoption as a replacement for the ageing fleet of locomotives working the steam-hauled trains on the Central Section. During the period of the 1948 Locomotive Exchanges, No. 42199 ran a special trial train from Ashford (Kent) to Victoria, on April 26, 1948. A top speed of 85 mph was attained on this journey. No. 42199 is seen leaving Ashford on this occasion. [*P. Ransome-Wallis*

performed ranged from branch line and stopping trains to semi-fast express duties. They were used on the Southend line and in the Glasgow Suburban and Clyde Coast areas, as well as on outer-surburban duties from Euston and St. Pancras. Other duties included banking and trip freight work, whilst on occasions they were called upon to act as pilots to ailing main-line express engines.

The engines were built as follows:

Nos. 2673–2699	Derby	1945
Nos. 2200–2217	Derby	1945
Nos. 2218–2264	Derby	1946
Nos. 2265–2299	Derby	1947
Nos. 2187–2189	Derby	1947
Nos. 42147–42161	Derby	1948
Nos. 42190–42199	Derby	1948
Nos. 42162–42186	Derby	1949
Nos. 42107–42132	Derby	1949
Nos. 42133–42146	Derby	1950
Nos. 42050–42053	Derby	1950
Nos. 42054–42065	Derby	1951
Nos. 42066–42106	Brighton	1950/51

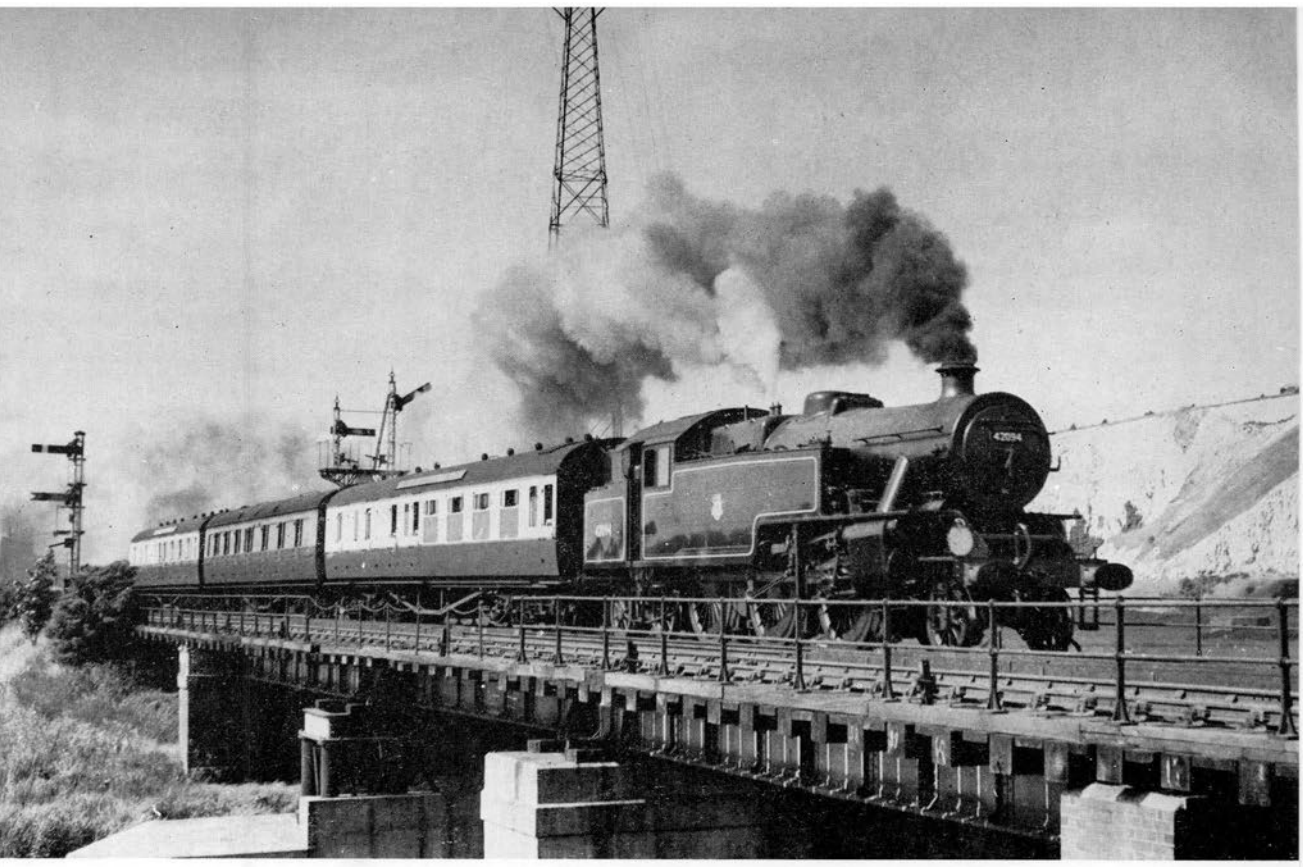
FIRST OF CLASS WITHDRAWN: 42217 9/61

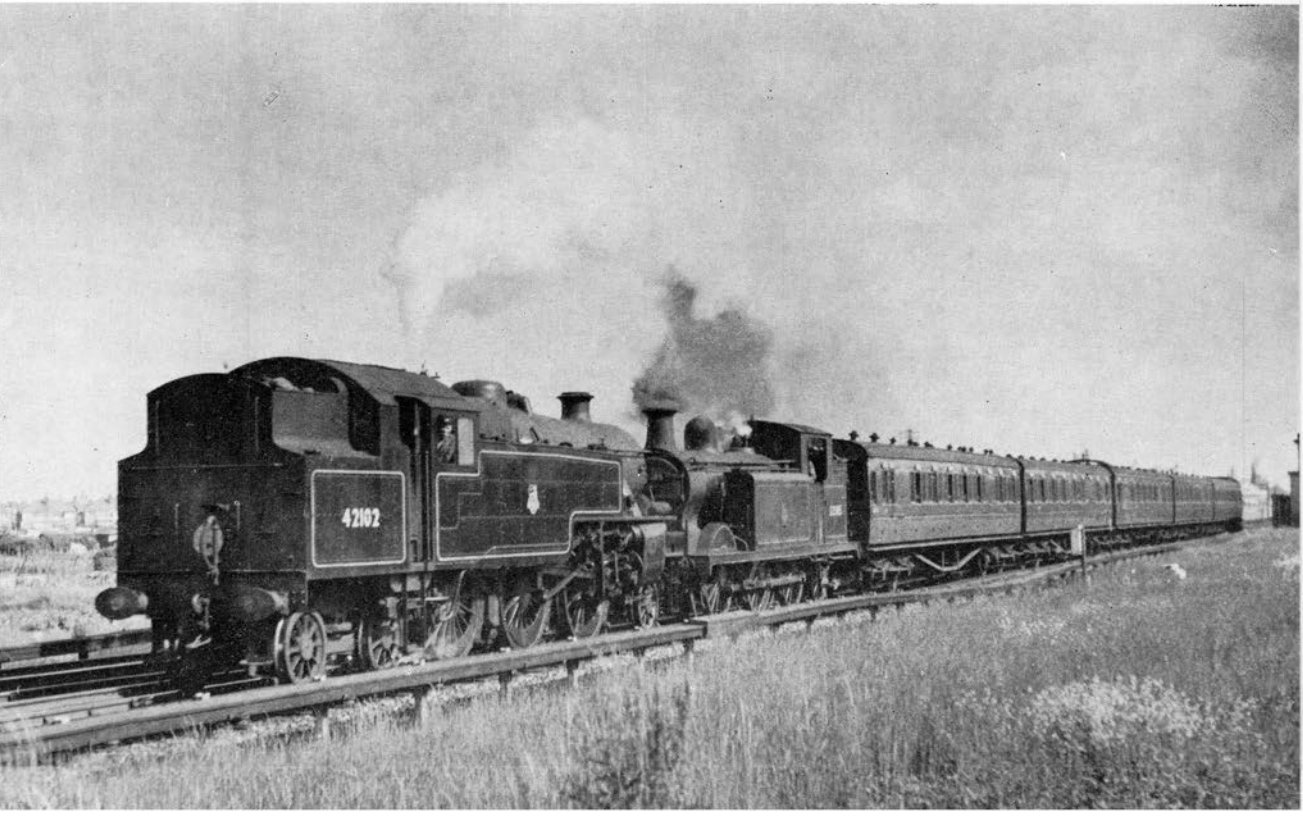
EXAMPLES PRESERVED: 42073/85

Opposite page:

Top. The trials with Nos. 42198/9 evidently proved satisfactory, as the decision was taken to construct 41 Fairburn 2-6-4Ts at Brighton Works for service on the Southern Region. Thus, for the second time in less than 10 years, Stanier locomotives were built at Brighton. The 2-6-4Ts were allocated to the SR Central Section, and gained a good reputation. No. 42094 is illustrated working the 7.40 am Birkenhead–Hastings through train, crossing Southerham Bridge, Lewes; on June 11, 1951. [*S. C. Nash*

Bottom. Brighton-built 2-6-4T No. 42102 double heads SR 0-6-2T No. 32585 on the 4.39pm to Tunbridge Wells West, seen leaving Eastbourne on May 30, 1952. The Brighton-built Fairburn tanks were later drafted back to the London Midland, North Eastern and Scottish Regions, when new BR standard 2-6-4Ts took over their duties on the Southern. [*S. C. Nash*




42102

Above. No. 42056, built at Derby, catches the evening sunlight as it leaves Glasgow St. Enoch with a stopping train for the Ayrshire Coast. [*D. Cross*

Below. Deputising for a failed Britannia class Pacific; 2-6-4T No. 42214 was photographed on Beattock Bank with a Ripon–Rutherglen troop special, at Greskine, on July 25, 1964. The train was banked from Greskine. [*D. Cross*

Named Locomotives

Showing all named Stanier locomotives taken over by British Railways, on January 1st 1948, and additional locomotives constructed under BR auspices.

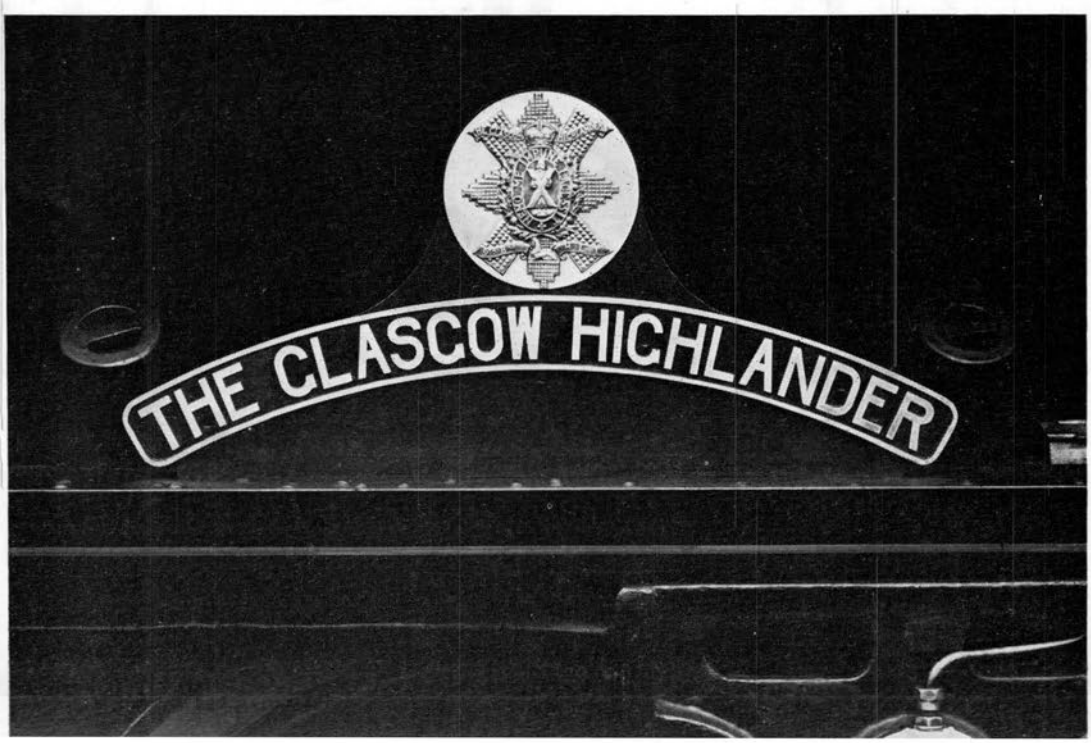
Former LMSR locomotives are listed with the numbers carried prior to nationalisation. Locomotives constructed during nationalised days are shown in italics and with their BR number. All locomotives had 40000 added to their existing running numbers, by BR. Thus for example, No. 6220 became No. 46220. For a while some locomotives carried the prefix **M** to their LMSR numbers, in 1948, prior to renumbering.

Power classifications were altered during BR days; the 6P 4-6-0s becoming 7P and the 7P 4-6-2s becoming 8P; the 5XPs became 6P.

4-6-0 CLASS 5 Mixed-Traffic

(*See page 40*)

5154 Lanarkshire Yeomanry
5156 Ayrshire Yeomanry
5157 The Glasgow Highlander
5158 Glasgow Yeomanry



4-6-0 CLASS 6P (3-cyl.)

REBUILT BY IVATT TO STANIER DESIGN

Patriot

(*See page 112*)

45512 *Bunsen*
5514 Holyhead
5521 Rhyl
45522 *Prestatyn*
45523 *Bangor*
45525 *Colwyn Bay*
5526 Morecambe and Heysham
45527 *Southport*
5528 (1960: *R.E.M.E.*)
5529 (1949: *Stephenson*)
5530 Sir Frank Ree
5531 Sir Frederick Harrison
45532 *Illustrious*
45534 *E. Tootal Broadhurst*
45535 *Sir Herbert Walker, K.C.B.*
45536 *Private W. Wood, V.C.*
5540 Sir Robert Turnbull
45545 (1948: *Planet*)

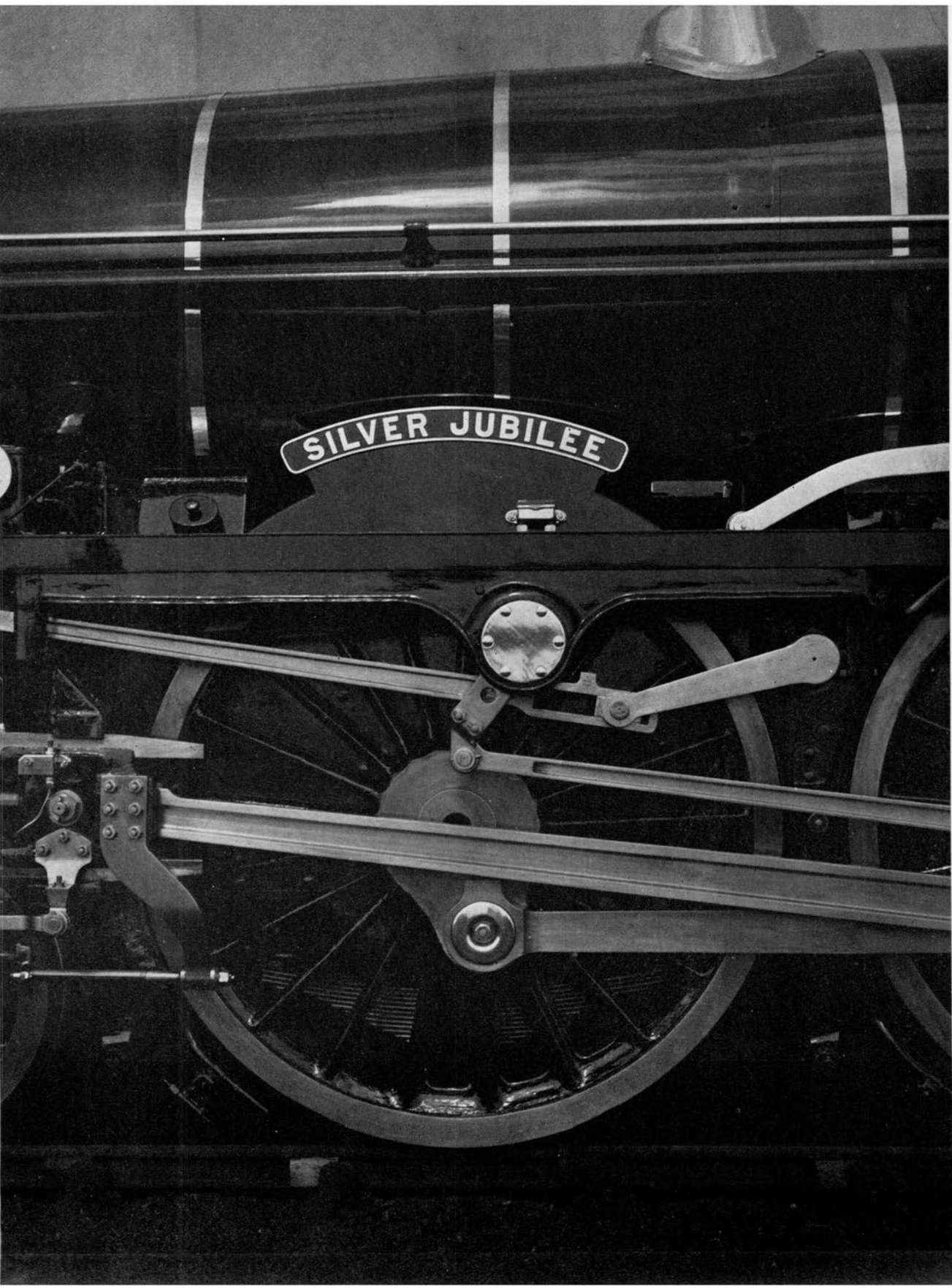
4-6-0 CLASS 5XP and 6P* (3-cyl.)

Jubilee

(*See page 31 and page 104**)

5552 Silver Jubilee
†5553 Canada
5554 Ontario
5555 Quebec
5556 Nova Scotia
5557 New Brunswick
5558 Manitoba
5559 British Columbia
5560 Prince Edward Island
5561 Saskatchewan
5562 Alberta
5563 Australia
5564 New South Wales
5565 Victoria
5566 Queensland
5567 South Australia
5568 Western Australia
5569 Tasmania
5570 New Zealand
5571 South Africa
5572 Eire
5573 Newfoundland
5574 India
5575 Madras
5576 Bombay
5577 Bengal
5578 United Provinces
5579 Punjab
5580 Burma
5581 Bihar and Orissa
5582 Central Provinces
5583 Assam
5584 North West Frontier
5585 Hyderabad
5586 Mysore
5587 Baroda
5588 Kashmir
5589 Gwalior
5590 Travancore
5591 Udaipur
5592 Indore
5593 Kolhapur
5594 Bhopal
5595 Southern Rhodesia

Opposite. Close-up view of the nameplate of No. 5552 *Silver Jubilee*, which also shows the special black and chromium livery that this locomotive carried in pre-war days. [*BR*


SILVER JUBILEE

†5596 Bahamas
5597 Barbados
5598 Basutoland
5599 Bechuanaland
5600 Bermuda
5601 British Guiana
5602 British Honduras
5603 Solomon Islands
5604 Ceylon
5605 Cyprus
5606 Falkland Islands
5607 Fiji
5608 Gibraltar
5609 Gilbert and Ellice Islands
5610 Gold Coast (1958: *Ghana*)
5611 Hong Kong
5612 Jamaica
5613 Kenya
5614 Leeward Islands
5615 Malay States
5616 Malta G.C. (*formerly Malta*)
5617 Mauritius
5618 New Hebrides
5619 Nigeria
5620 North Borneo
5621 Northern Rhodesia
5622 Nyasaland
5623 Palestine
5624 St. Helena
5625 Sarawak
5626 Seychelles
5627 Sierra Leone
5628 Somaliland
5629 Straits Settlements
5630 Swaziland
5631 Tanganyika
5632 Tonga
5633 Aden (*formerly Trans-Jordan*)
5634 Trinidad
5635 Tobago
5636 Uganda
5637 Windward Islands
5638 Zanzibar
5639 Raleigh
5640 Frobisher
5641 Sandwich
5642 Boscawen
5643 Rodney
5644 Howe
5645 Collingwood
5646 Napier
5647 Sturdee
5648 Wemyss
5649 Hawkins
5650 Blake
5651 Shovell
5652 Hawke
5653 Barham
5654 Hood
5655 Keith
5656 Cochrane
5657 Tyrwhitt
5658 Keyes
5659 Drake
5660 Rooke
5661 Vernon
5662 Kempenfelt
5663 Jervis
5664 Nelson
5665 Lord Rutherford of Nelson
5666 Cornwallis
5667 Jellicoe
5668 Madden
5669 Fisher
5670 Howard of Effingham
5671 Prince Rupert
5672 Anson
5673 Keppel
5674 Duncan
5675 Hardy
5676 Codrington
5677 Beatty
5678 De Robeck
5679 Armada
5680 Camperdown
5681 Aboukir
5682 Trafalgar
5683 Hogue
†5684 Jutland
5685 Barfleur
5686 St. Vincent
5687 Neptune
5688 Polyphemus
5689 Ajax
5690 Leander
5691 Orion
5692 Cyclops
5693 Agamemnon
5694 Bellerophon
5695 Minotaur
5696 Arethusa
5697 Achilles
5698 Mars
5699 Galatea
5700 Britannia (1951: *Amethyst*)
5701 Conqueror
5702 Colossus
5703 Thunderer
5704 Leviathan
5705 Seahorse

5706 Express
5707 Valiant
5708 Resolution
5709 Implacable
5710 Irresistible
5711 Courageous
5712 Victory
5713 Renown
5714 Revenge
5715 Invincible
5716 Swiftsure
5717 Dauntless
5718 Dreadnought
5719 Glorious
5720 Indomitable
5721 Impregnable
†5722 Defence
5723 Fearless
5724 Warspite
5725 Repulse
5726 Vindictive
5727 Inflexible
5728 Defiance
5729 Furious
5730 Ocean
5731 Perseverance
5732 Sanspareil
5733 Novelty
5734 Meteor
*5735 Comet
*5736 Phoenix
5737 Atlas
5738 Samson
5739 Ulster
5740 Munster
5741 Leinster
†5742 Connaught

*Rebuilt 1942 with larger boilers and double chimneys. Reclassified 6P.
†Fitted with double chimneys at various times.

4-6-0 CLASS 6P (3-cyl.)

Converted Royal Scot

(*See page 107 and page 84**)

46100 Royal Scot
6101 Royal Scots Grey
46102 Black Watch
6103 Royal Scots Fusilier
6104 Scottish Borderer
46105 Cameron Highlander
46106 Gordon Highlander
46107 Argyll and Sutherland Highlander
6108 Seaforth Highlander
6109 Royal Engineer
46110 Grenadier Guardsman
6111 Royal Fusilier
6112 Sherwood Forester
46113 Cameronian
6114 Coldstream Guardsman
6115 Scots Guardsman
6116 Irish Guardsman
6117 Welsh Guardsman
6118 Royal Welch Fusilier
6119 Lancashire Fusilier
6120 Royal Inniskilling Fusilier
6121 Highland Light Infantry, City of Glasgow Regiment, (*formerly H.L.I.*)
6122 Royal Ulster Rifleman
46123 Royal Irish Fusilier
6124 London Scottish
6125 3rd Carabinier
6126 Royal Army Service Corps
6127 Old Contemptibles
6128 The Lovat Scouts
6129 The Scottish Horse
46130 The West Yorkshire Regiment
6131 The Royal Warwickshire Regiment
6132 The King's Regiment, Liverpool
6133 The Green Howards
46134 The Cheshire Regiment
6135 The East Lancashire Regiment

46136 *The Border Regiment*
46137 *The Prince of Wales's Volunteers (South Lancashire)*
6138 The London Irish Rifleman
6139 The Welch Regiment
46140 *The King's Royal Rifle Corps*
46141 *The North Staffordshire Regiment*
46142 *The York & Lancaster Regiment*
46143 *The South Staffordshire Regiment*
6144 Honourable Artillery Company
6145 The Duke of Wellington's Regt. (West Riding)
6146 The Rifle Brigade
6147 The Northamptonshire Regiment
46148 *The Manchester Regiment*
6149 The Middlesex Regiment
6150 The Life Guardsman
46151 *The Royal Horse Guardsman*
6152 The King's Dragoon Guardsman
46153 *The Royal Dragoon*
6154 The Hussar
46155 *The Lancer*
46156 *The South Wales Borderer*
6157 The Royal Artilleryman
46158 *The Loyal Regiment*
6159 The Royal Air Force
6160 Queen Victoria's Rifleman
6161 King's Own
46162 *Queen's Westminster Rifleman*
46163 *Civil Service Rifleman*
46164 *The Artists' Rifleman*
46165 *The Ranger (12th London Regt.)*
6166 London Rifle Brigade
46167 *The Hertfordshire Regiment*
6168 The Girl Guide
6169 The Boy Scout
*6170 British Legion

*Introduced 1935. Stanier taper-boiler rebuild of experimental high-pressure compound locomotive No. 6399 *Fury*.

4-6-2 CLASS 7P (4-cyl.)

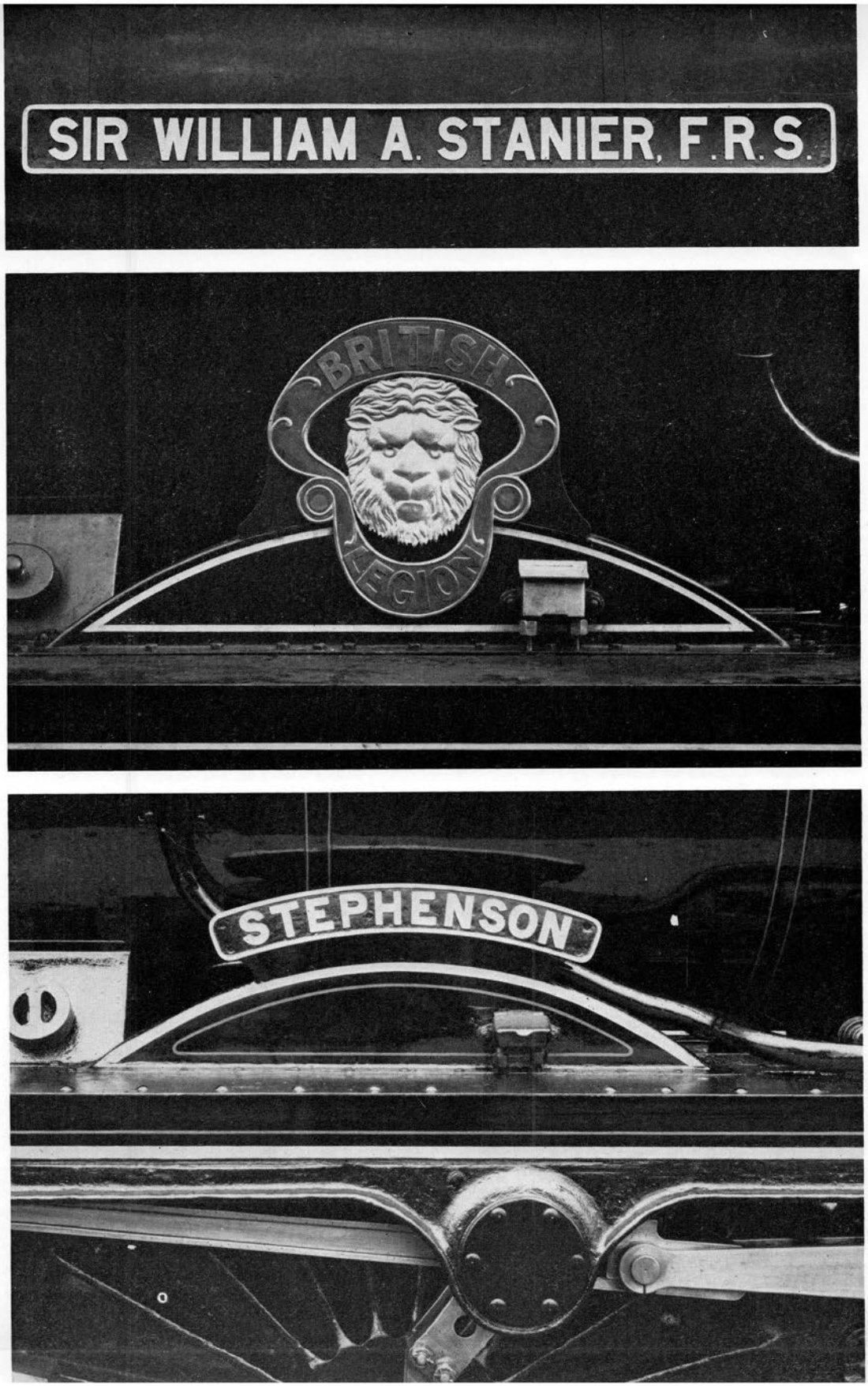
Princess Royal

(*See page 18 and page 59**)

6200 The Princess Royal
6201 Princess Elizabeth
*6202 (1952: *Princess Anne*)
6203 Princess Margaret Rose
6204 Princess Louise
6205 Princess Victoria
6206 Princess Marie Louise
6207 Princess Arthur of Connaught
6208 Princess Helena Victoria
6209 Princess Beatrice
6210 Lady Patricia
6211 Queen Maud
6212 Duchess of Kent

*Introduced 1935. Experimental turbine-driven locomotive (the Turbomotive). Rebuilt 1952 as conventional 4-cyl. Pacific.

Opposite. Typical nameplates from Stanier locomotives, showing their simple, but attractive, style. **Top:** Coronation Pacific No. 46256. **Centre:** Royal Scot 4-6-0 No. 46170. **Bottom:** Rebuilt Patriot 4-6-0 No. 45529. [*BR*


SIR WILLIAM A. STANIER, F.R.S.
BRITISH
LEGION
STEPHENSON

Above. Sir William A. Stanier at the controls of Coronation Pacific No. 6256 on the occasion of the naming ceremony in his honour; December 17, 1947. Standing on the footplate is Sir Robert Burrows, Chairman of the LMSR. [*BR*

4-6-2 CLASS 7P (4-cyl.)

Coronation

(*See page 87*).

6220	Coronation	6239	City of Chester
6221	Queen Elizabeth	6240	City of Coventry
6222	Queen Mary	6241	City of Edinburgh
6223	Princess Alice	6242	City of Glasgow
6224	Princess Alexandra	6243	City of Lancaster
6225	Duchess of Gloucester	6244	King George VI
6226	Duchess of Norfolk	6245	City of London
6227	Duchess of Devonshire	6246	City of Manchester
6228	Duchess of Rutland	6247	City of Liverpool
6229	Duchess of Hamilton	6248	City of Leeds
6230	Duchess of Buccleuch	6249	City of Sheffield
6231	Duchess of Atholl	6250	City of Lichfield
6232	Duchess of Montrose	6251	City of Nottingham
6233	Duchess of Sutherland	6252	City of Leicester
6234	Duchess of Abercorn	6253	City of St. Albans
6235	City of Birmingham	6254	City of Stoke-on-Trent
6236	City of Bradford	6255	City of Hereford
6237	City of Bristol	†6256	Sir William A. Stanier, F.R.S.
6238	City of Carlisle	†*46257*	*City of Salford*

†Introduced 1947. Ivatt development with roller bearings and detail alterations.

Opposite. Close-up of Coronation Pacific No. 46236 *City of Bradford* at Kings Cross, during the 1948 Locomotive Exchanges; with Driver Byford. [*BR*

CITY OF BRADFORD

The end of the day; 'Black Five' and engineman. Oxley shed. [*R. N. Hedges*